CLAIMS

[Claim(s)]

[Claim 1]In a transmission method of a burst signal at the time of transmitting a burst signal to a receiving station from the transmitting station concerned with a transmission power value and/or a transmission rate which were defined according to a state of a radio transmission line between a transmitting station and a receiving station in a mobile communication system, It is judged whether a burst signal should be transmitted based on a comparison result with a state of a radio transmission line between a standard beforehand established according to a state of the radio transmission line concerned, and/or a state of waiting for transmission of the signal concerned, the transmitting station concerned, and a receiving station, A transmission method of a burst signal which transmits a burst signal from a transmitting station to a receiving station when judged with a burst signal being transmitted.

[Claim 2]it sets to a transmission method of the burst signal according to claim 1 --- a transmission method of a burst signal with which the above-mentioned standard was established based on a state of the radio transmission line concerned.

[Claim 3]it sets to a transmission method of the burst signal according to claim 1 or 2 --- a transmission method of a burst signal with which a judgment of whether to transmit the above-mentioned burst signal was further made depending on a transmitting waiting state of a burst signal.

[Claim 4]it sets to a transmission method of the burst signal according to claim 3 --- a transmission method of a burst signal set that the above-mentioned standard is dependent on a waiting state of transmission of a burst signal.

[Claim 5]either of claims 1 thru/or 4 --- it sets to a transmission method of a burst

signal of a statement -- a transmission method of a burst signal carried out as [make / further / a judgment of whether to transmit a burst signal / depending on performance demanded from transmission of a burst signal].

[Claim 6]it sets to a transmission method of the burst signal according to claim 5 -- a transmission method of a burst signal set that the above-mentioned standard is dependent on performance demanded from transmission of a burst signal.

[Claim 7]it sets to a transmission method of the burst signal according to claim 5 or 6 -- a transmission method of a burst signal set that either [at least] a transmission power value of a burst signal which should be transmitted, or a transmission rate is dependent on performance demanded from transmission of the burst signal concerned further.

[Claim 8]either of claims 1 thru/or 7 -- the above-mentioned standard being expressed as a standard transmission power value and/or a standard transmission rate, and in a transmission method of a burst signal of a statement. A transmission method of a burst signal which judged whether a burst signal should have been transmitted based on a comparison result with a transmission power value and/or a transmission rate which were defined according to a state of this standard transmission power value and/or a standard transmission rate, and the above-mentioned radio transmission line.

[Claim 9]either of claims 1 thru/or 8 -- a transmission method of a burst signal with which a state of said radio transmission line includes not only a state of a radio transmission line of said transmitting station and a receiving station which is the addresses of the burst signal concerned but a state of a radio transmission line between other receiving stations in a transmission method of a burst signal of a statement.

[Claim 10]it sets to a transmission method of the burst signal according to claim 9 -- a transmission method of a burst signal which said standard is the standard total power value, and chooses a burst which can transmit from said two or more burst signals so that total of a transmission power value of two or more burst signals may not exceed said standard total power value.

[Claim 11]In a transmission method of the burst signal according to claim 10, choose a burst signal from said two or more burst signals in predetermined order, and the sum total of a transmission power value is searched for, A transmission method of a burst signal judge that is [the selected burst signal concerned] ready for sending when this sum total does not exceed said standard total power value.

[Claim 12]A sending set characterized by comprising the following in a mobile

communication system which transmits a burst signal to the receiving station concerned with a transmission power value and/or a transmission rate which were defined according to a state of a radio transmission line between receiving stations.
A ready-for-sending non-standard determination means to determine a ready-for-sending non-standard of a burst signal.
A judging means which judges whether a burst signal should be transmitted based on a comparison result with a state of a radio transmission line between a ready-for-sending non-standard determined by this ready-for-sending non-standard determination means, and the receiving station concerned.
A transmission control means which transmits a burst signal to a receiving station when judged with a burst signal being transmitted in the above-mentioned judging means.

[Claim 13]it sets to a sending set in the mobile communication system according to claim 12 -- a sending set in a mobile communication system with which the above-mentioned ready-for-sending non-standard determination means determined a ready-for-sending non-standard based on a state of a radio transmission line between receiving stations.
[Claim 14]A sending set in a mobile communication system for which a decision result in the above-mentioned judging means depended on a transmitting waiting state of a burst signal further in a sending set in the mobile communication system according to claim 12 or 13.
[Claim 15]it sets to a sending set in the mobile communications system according to claim 14 -- a sending set in a mobile communication system determined that the above-mentioned ready-for-sending non-standard determination means will depend for the above-mentioned ready-for-sending non-standard on a waiting state of transmission of a burst signal further.
[Claim 16]either of claims 12 thru/or 15 -- it sets to a sending set in a mobile communication system of a statement -- a sending set in a mobile communication system for which a decision result in the above-mentioned judging means depended on the performance demanded from transmission of a burst signal further.
[Claim 17]it sets to a sending set in the mobile communication system according to claim 16 -- a sending set in a mobile communication system it was determined that will depend for the above-mentioned ready-for-sending non-standard determination means on performance of which the above-mentioned ready-for-sending non-standard is further required from transmission of a burst signal.

[Claim 18]In a sending set in the mobile communications system according to claim 16 or 17, A sending set in a mobile communication system which has a transmission power determination means defined based on performance of which a transmission power value of a burst signal which should be transmitted is required from transmission of the burst signal concerned with a state of the above-mentioned radio transmission line.

[Claim 19]either of claims 12 thru/or 18 --- it sets to a sending set in a mobile communication system of a statement --- the above-mentioned ready-for-sending non-standard determination means, Determine a standard transmission power value as a ready-for-sending non-standard, and the above-mentioned judging means, A sending set in a mobile communication system which judged whether a burst signal should have been transmitted based on a comparison result of a standard transmission power value determined by the above-mentioned ready-for-sending non-standard determination means, and a transmission power value defined according to a state of the above-mentioned radio transmission line.

[Claim 20]In a sending set in the mobile communications system according to claim 16 or 17, A sending set in a mobile communications system which has a transmission rate determination means to define a transmission rate of a burst signal which should be transmitted based on performance of which it is required from transmission of the burst signal concerned with a state of the above-mentioned radio transmission line.

[Claim 21]it sets to a sending set in a mobile communications system of claim 12 thru/or 18 given in any 1 paragraph --- the above-mentioned ready-for-sending non-standard determination means, Determine a standard transmission rate as a ready-for-sending non-standard, and the above-mentioned judging means, A sending set in a mobile communications system which judged whether a burst signal should have been transmitted based on a comparison result of a standard transmission rate determined by the above-mentioned ready-for-sending non-standard determination means, and a transmission rate defined according to a state of the above-mentioned radio transmission line.

[Claim 22]it sets to a sending set in a mobile communications system of claim 12 thru/or 18 given in any 1 paragraph --- the above-mentioned ready-for-sending non-standard determination means, Determine a standard transmission power value and a standard transmission rate as a ready-for-sending non-standard, and the above-mentioned judging means, A sending set in a mobile communications system which judged whether a burst signal should have been transmitted based on a comparison result with a transmission power value and a transmission rate which were

defined according to a state of a standard transmission power value and a standard transmission rate which were determined by the above-mentioned ready-for-sending non-standard determination means, and the above-mentioned radio transmission line.

[Claim 23]In a sending set in a mobile communications system of claim 12 thru/or 22 given in any 1 paragraph, said judging means, A sending set in a mobile communications system judged in consideration of a state of a radio transmission line not only between a state of a radio transmission line of said transmitting station and a receiving station which is the addresses of the burst signal concerned but other receiving stations.

[Claim 24]it sets to a sending set in the mobile communications system according to claim 23 --- as for said ready-for-sending non-standard determination means, said standard determines the standard total power value as said ready-for-sending non-standard --- said judging means, A sending set in a mobile communications system which chose a burst which can transmit from said two or more burst signals so that total of a transmission power value of two or more burst signals might not exceed said standard total power value.

[Claim 25]In a sending set in the mobile communications system according to claim 24, said judging means chooses a burst signal from said two or more burst signals in predetermined order, and the sum total of a transmission power value is searched for, A sending set in a mobile communications system judged that is [the selected burst signal concerned] ready for sending when this sum total did not exceed said standard total power value.

[Claim 26]In an information distribution method for the moving machine concerned in a mobile communication system which communicates between a base station and a moving machine, 1 or two or more base stations which should communicate with a moving machine are determined, and information which should be distributed to a moving machine is distributed to 1 or two or more base stations which were determined [above-mentioned] --- an information distribution method in a mobile communication system with which each base station transmitted distributed information to a moving machine, respectively.

[Claim 27]it sets to an information distribution method in the mobile communication system according to claim 26 --- an information distribution method in a mobile communication system which determined 1 or two or more base stations which should communicate with the moving machine concerned based on a state of a radio transmission line between moving machines.

[Claim 28]it sets to an information distribution method in the mobile communication

system according to claim 26 or 27 --- an information distribution method in a mobile communication system which determined 1 or two or more base stations which should communicate with the moving machine concerned based on performance demanded from transmission of information which should be distributed to a moving machine.

[Claim 29]either of claims 26 thru/or 28 --- it sets to an information distribution method in a mobile communication system of a statement --- an information distribution method in a mobile communication system which determined 1 or two or more base stations which should communicate with the moving machine concerned based on a transmitting waiting state of information in each base station which should be distributed.

[Claim 30]either of claims 26 thru/or 29 --- it sets to an information distribution method in a mobile communication system of a statement --- an information distribution method in a mobile communication system which distributed without duplication information which should be distributed to a moving machine to two or more determined base stations.

[Claim 31]either of claims 26 thru/or 29 --- in an information distribution method in a mobile communication system of a statement, An information distribution method in a mobile communication system which reproduced a part or all of information that should be distributed to a moving machine, overlaps with two or more determined base stations, and distributed a part concerned or all of information that should be distributed to them.

[Claim 32]either of claims 26 thru/or 31 --- it sets to an information distribution method in a mobile communication system of a statement --- an information distribution method in a mobile communication system with which more information was distributed to two or more determined base stations as a base station with little quantity of information which will be in a state waiting for transmitting.

[Claim 33]either of claims 26 thru/or 31 --- it sets to an information distribution method in a mobile communication system of a statement --- an information distribution method in a mobile communication system carried out to two or more determined base stations as [distribute / as a base station where a state of a radio transmission line between moving machines is better / more information].

[Claim 34]either of claims 26 thru/or 31 --- in an information distribution method in a mobile communication system of a statement, An information distribution method in a mobile communication system which determined distributing quantity of information over two or more determined base stations in each base station based on quantity of information which will be in a state waiting for transmitting, and a state of a radio

transmission line between moving machines.

[Claim 35]In an information distribution method in the mobile communication system according to claim 34, An information distribution method in a mobile communication system which distributed information so that quantity of information from which it will be in a state waiting for transmitting as a base station where a state of a radio transmission line between moving machines becomes better might increase to two or more determined base stations.

[Claim 36]either of claims 26 thru/or 35 -- in an information distribution method in a mobile communication system of a statement, when a state of information of being in a state waiting for transmitting and stagnating in each base station will be in a predetermined state, a part or all of information that will be in a state waiting for transmitting are collected -- an information distribution system in a mobile communication system which is made into information which should distribute this collected information, and was redistributed to 1 or two or more base stations.

[Claim 37]it sets to an information distribution method in the mobile communication system according to claim 36 -- an information distribution method in a mobile communication system which canceled the collected information when the above-mentioned information was collected and time which was stagnating without transmitting the collected information to a moving machine turned into beyond predetermined time.

[Claim 38]In a distribute information control device which performs distribute information control to the moving machine concerned in a mobile communication system which has a base station and a moving machine, A base station determination means to determine 1 or two or more base stations which should communicate with a moving machine, it has an information dispensing means which distributes information which should be distributed to a moving machine to a base station determined by this base station determination means -- a distribute information control device with which each of each base station enabled it to transmit information distributed in this information dispensing means to a moving machine.

[Claim 39]it sets to the distribute information control device according to claim 38 -- a distribute information control device which determined 1 or two or more base stations where the above-mentioned base station determination means should communicate with the moving machine concerned based on a state of a radio transmission line between moving machines.

[Claim 40]it sets to the distribute information control device according to claim 38 or 39 -- a distribute information control device which determined 1 or two or more base

stations which should communicate with the moving machine concerned based on performance demanded from transmission of information which should distribute the above-mentioned base station determination means to a moving machine.

[Claim 41]either of claims 38 thru/or 40 -- it sets to a distribute information control device of a statement -- a distribute information control device which determined 1 or two or more base stations which should communicate with the moving machine concerned based on a transmitting waiting state of information which should distribute the above-mentioned base station determination means to a moving machine in each base station.

[Claim 42]either of claims 38 thru/or 41 -- it sets to a distribute information control device of a statement -- a distribute information control device which distributed information which should distribute the above-mentioned information dispensing means to a moving machine to two or more determined base stations without duplication.

[Claim 43]either of claims 38 thru/or 41 -- it sets to a distribute information control device of a statement -- a distribute information control device which the above-mentioned information distribution means reproduced a part or all of information that should be distributed to a moving machine, and overlaps with two or more determined base stations, and distributed a part concerned or all of information that should be distributed to them.

[Claim 44]either of claims 38 thru/or 43 -- it sets to a distribute information control device of a statement -- a distribute information control device with which more information was distributed as a base station with little quantity of information which will be in a state waiting for transmitting to two or more determined base stations for the above-mentioned information distribution means.

[Claim 45]either of claims 38 thru/or 43 -- it sets to a distribute information control device of a statement -- a distribute information control device which carried out the above-mentioned information distribution means as [distribute / to two or more determined base stations / as a base station where a state of a radio transmission line between moving machines is better / more information].

[Claim 46]either of claims 38 thru/or 43 -- it sets to a distribute information control device of a statement -- a distribute information control device which determined distributing quantity of information over two or more base stations where the above-mentioned information distribution means was determined in each base station based on quantity of information which will be in a state waiting for transmitting, and a state of a radio transmission line between moving machines.

[Claim 47]it sets to the distribute information control device according to claim 46 -- a distribute information control device which as for the above-mentioned information distribution means distributed information so that quantity of information from which it will be in a state waiting for transmitting as a base station which becomes better [a state of a radio transmission line between moving machines] to two or more determined base stations might increase.

[Claim 48]either of claims 38 thru/or 47 -- it sets to a distribute information control device of a statement, when a state of information of being in a state waiting for transmitting and stagnating in each base station will be in a predetermined state further, it has an information recovery means which collects a part or all of information that will be in a state waiting for transmitting -- a distribute information control device which makes the above-mentioned information distribution means information which should distribute this collected information, and was redistributed to 1 or two or more base stations.

[Claim 49]it sets to the distribute information control device according to claim 48 -- a distribute information control device which has an information cancellation means to cancel the collected information when the above-mentioned information is collected and time which was stagnating without transmitting the collected information to a moving machine turns into beyond predetermined time further.

[Claim 50]A receiving set characterized by comprising the following in a mobile communication system which transmits a burst signal transmitted from a transmitting station with a transmission power value and/or a transmission rate which were defined according to a state of a radio transmission line.

A receiving quality measuring means which measures receiving quality from an input signal.

A receiver reference electrode determination means to determine a receiver reference electrode according to measured receiving quality.

A signal strength detector which detects a state of a radio transmission line.

A receiver ready-for-sending non-judging means which judges whether a transmitting station should transmit a burst signal based on a comparison result of said receiver reference electrode and a state of a radio transmission line.

A means to transmit this decision result to a transmitting station.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

Background art This invention relates to the transmission method and device of a burst signal in a mobile communication system, and in detail, the transmission method of the burst signal at the time of transmitting a burst signal to a receiving station from the transmitting station concerned with the transmission power value and/or transmission rate value which were defined according to the state of the radio transmission line between the transmitting station and receiving station in a mobile communication system --- and, It is related with the sending set which transmits a burst signal to a receiving station with such a transmission power value and/or a transmission rate value. This invention relates also to the information distribution method which can apply the transmission method and device of the above-mentioned burst signal.

Prior art The base station arranged in the mobile communication system in the service area, [many] When the transmitting and receiving state of a position and an electric wave transmits and receives a burst signal between the mobile stations which change every moment, It is a technical problem important for reduction of peak transmission power, and system-capacity increase how a suitable base station is chosen or suitable transmission power is determined, how the transmission rate in adaptive modulation is determined [how], or how a burst signal (data) is transmitted at a suitable stage. In particular, in variously different multimedia communication, data volume, the performance demanded, and quality assign required and sufficient resources (power resources, frequency resources, etc.) to each communication to a Request to Send, and have been a technical problem also with important also aiming at guarantee of service, and increase of user capacity by this.

Transmission of the burst signal in the conventional mobile communication system is made as follows. That is, the burst signal with which a transmitting station (for example, base station) is provided is accumulated in queuing one by one, the burst signal within this queuing is taken out without delay, and that taken-out burst signal is transmitted to a receiving station (for example, mobile station) at the next transmitter meetings (timing of a slot, etc.). Thereby, the burst signal with which a transmitting station is provided one by one is transmitted to a receiving station so that the delay may serve as the minimum.

In the conventional mobile communication system, the transmission power value and/or the transmission rate value are decided based on the state of the radio transmission line between a transmitting station and a receiving station. Namely, the transmission line states (for example, rate of signal attenuation depending on the

distance between a transmitting station and a receiving station, etc.) between a transmitting station and a receiving station are measured, Based on the measured value, the transmission power value and/or the transmission rate value are decided so that the signal in predetermined receiving quality (for example, receiving level) can be received in a receiving station. Thus, by deciding the transmission power value and/or transmission rate value of the burst signal which should be transmitted from a transmitting station to a receiving station, Even if the relative physical relationship between a transmitting station and a receiving station, the damping property of a transmitted wave, etc. change with movement of a mobile station, change of a base station chosen, etc. variously, a burst signal is always receivable in predetermined receiving quality in a receiving station.

In the mobile communication system with which a burst signal is transmitted to a receiving station from a transmitting station with the transmission power value and/or transmission rate value which were decided according to the state of the radio transmission line between a transmitting station and a receiving station as mentioned above, In the transmission method of the conventional burst signal with which a transmission period is decided that the delay serves as the minimum, the burst signal with which a transmitting station is provided. The transmission power value as which it is bad (for example, for phasing to fall greatly), and the state of the radio transmission line was determined at the stage when it should transmit according to the state may become very large. In such a case, if a burst signal is transmitted with the defined transmission power value, a peak transmission power value will become large and the power consumption in a transmitting station will increase. The interference to communication of other mobile stations will become large according to increase of the average-transmission-power value accompanying increase of the peak transmission power value.

Thus, in the transmission method of the conventional burst signal. Since the stage when a burst signal should be transmitted was determined without taking into consideration the state of the radio transmission line between a transmitting station and a receiving station at all so that delay might only serve as the minimum, When transmitting a burst signal, the transmission power value and/or transmission rate value which are defined according to the state of the radio transmission line are not a not necessarily suitable thing for a mobile communication system.

In the above mobile communication systems, distribution of information to a moving machine is performed as follows.

Periodically, the path loss (or the average) of the radio transmission line between a

moving machine and two or more base stations is measured, and one base station where the measured value serves as the minimum is chosen. And data is distributed by radio from the selected base station to a moving machine.

The cycle which chooses the above-mentioned base station can also be set [also setting up comparatively long (for example, several seconds) and] up comparatively short (for example, several milliseconds). When this cycle is set up comparatively long, substantially, distribution of data comes to be performed from the nearest base station in distance, and distribution of the data to the moving machine in the state where it was stabilized on the average is attained from the current position of a moving machine. When the above-mentioned cycle is set up comparatively short, the sequential selection of the one base station where an instant path loss serves as the minimum is made for every minute time, and it becomes possible to reduce the transmission power in the mobile communication system to which transmission power control is performed so that the receiving level in a moving machine may serve as approximately regulated.

comparatively long, when the cycle which chooses the base station which should transmit to a moving machine as mentioned above is comparatively long -- time continuation is carried out and information is distributed from a single base station to a moving machine. Therefore, this comparatively long distribute information that carries out time continuation and is made from a single base station to a moving machine tends to receive instant change of phasing generated at random in the radio transmission line between a moving machine and each base station. For example, when the path loss in the radio transmission line between a moving machine and the base station concerned increases in instant (instant increase of phasing), in order for the error rate of the receipt information in a moving machine to increase or to compensate the path loss, transmission power will increase in instant.

Thus, when the cycle which chooses the base station which should transmit to a moving machine becomes comparatively long, reception of the information on a moving machine is not necessarily made in the good state.

Since the selection of a base station based on measurement of a path loss and its measured value, etc. must be processed a comparatively short cycle when the cycle which chooses the base station which should transmit to a moving machine as mentioned above is comparatively short, the controlled variable for processing concerning distribute information will increase.

Then, the technical problem of this invention so that it may not become what has as unsuitable for a mobile communication system the transmission power value and/or

transmission rate value which are defined according to the state of the radio transmission line as possible, when transmitting a burst signal. It is providing the transmission method and device of a burst signal which can determine the transmission period of the burst signal concerned.

This invention lessening the controlled variable concerning distribute information as much as possible. Reception of the information on a moving machine lessening the information distribution method in the mobile communication system made in the best possible state, and the controlled variable concerning distribute information as much as possible. Reception of the information on a moving machine makes it a technical problem to provide the distribute information control device made in the best possible state.

Indication of an invention An aforementioned problem is solvable by the following this inventions.

(1) In the transmission method of the burst signal at the time of transmitting a burst signal to a receiving station from the transmitting station concerned with the transmission power value and/or transmission rate which were defined according to the state of the radio transmission line between the transmitting station and receiving station in a mobile communication system, It is judged whether a burst signal should be transmitted based on a comparison result with the state of the radio transmission line between the standard beforehand established according to the state of the radio transmission line concerned, and/or the state of the waiting for transmission of the signal concerned, the transmitting station concerned, and a receiving station, When judged with a burst signal being transmitted, it is constituted so that a burst signal may be transmitted from a transmitting station to a receiving station.

If judged with a burst signal being transmitted in the transmission method of such a burst signal based on a comparison result with the state of the radio transmission line between the standard beforehand established according to the state of the radio transmission line concerned, and/or the state of the waiting for transmission of the signal concerned, the transmitting station concerned, and a receiving station, It is transmitted to a receiving station from the burst signal transmitting station concerned with the transmission power value defined according to the state of the radio transmission line.

Since the state of the radio transmission line concerned is reflected in the comparison result of the above-mentioned standard and the state of a radio transmission line according to the transmission method of such a burst signal, in consideration of the state of the radio transmission line, the transmission period

(should a burst signal be transmitted or not?) of a burst signal will be determined.
The above-mentioned transmitting stations may be any of the base station of a mobile communication system, and a mobile station. When a mobile station turns into a receiving station when a base station turns into a transmitting station, and a mobile station turns into a transmitting station, a base station turns into a receiving station.
The above-mentioned standard is set that the transmission power value and/or transmission rate which are provided in the transmission period of the burst signal judged based on the comparison result of the standard concerned and state of a radio transmission line based on the state of the radio transmission line concerned do not become as unsuitable for a mobile communication system as possible. It may be made to change this standard accommodative for every base station which performs every mobile station which performs every time zone and communication, or communication.
(2) In the transmission method of the above-mentioned burst signal, the above-mentioned standard can be constituted from a viewpoint that the state of a radio transmission line judges directly so that it may be set based on the state of the radio transmission line concerned.
The state of the radio transmission line used as the foundation at the time of establishing the above-mentioned standard, It is what expresses the transmission state of a burst signal directly or indirectly, For example, the instant path loss variation between transceiver offices, a data-communications error rate, a transmission throughput, The relative location of the distance between transceiver offices, and a transceiver office, the interference power value which a receiving station receives from other transmitting stations, It can express with receiver ready-for-sending un-judging [which was judged by the long section either those short section average /, such as the number of the partner receiving stations which transmit a burst signal from the same antenna, transmitting desired time, and a transmitted data amount, / or average, and receiving set side], or the combination of these plurality. These can also be acquired by measuring directly by the sending set side, and can also be acquired by transmitting as a control signal what was observed by the receiving set side. When observing by the receiving set side, can also transmit the measured value to the sending set side as a control signal in the form of the real number etc. as it is, and, It can also transmit to the sending set side as receiver ready-for-sending un-judging [which judged this based on the standard established by the receiver, and was expressed as a binary or a numerical value of the limited stage beyond it].
(3) It is judged whether in consideration of the state of a radio transmission line, a

burst signal should be transmitted as mentioned above, If there is much quantity of the burst signal with which a transmitting station is provided as a burst signal which should be transmitted when transmitting a burst signal based on the decision result, the waiting time of a burst signal will become long. Such a situation is not in the suitable situation for a mobile communication system. Then, this invention can be constituted from a viewpoint of avoiding such a situation so that the judgment of whether to transmit the above-mentioned burst signal may be made depending on the transmitting waiting state of a burst signal.

Since the judgment of whether to transmit a burst signal is performed in the transmission method of such a burst signal so that it may be dependent on the waiting state of a burst signal, The burst signal with which a transmitting station is provided can be transmitted that there is no delay as possible, holding a transmission power value and/or a transmission rate in the most suitable possible state.

The transmitting waiting state of the above-mentioned burst signal is what expresses directly or indirectly a waiting state until the burst signal with which the transmitting station was provided is transmitted. For example, last transmitting data volume of the burst signal which will be in the state of the waiting for transmission, maximum delay time of the burst signal which will be in a waiting state, average delay of the burst signal which will be in a waiting state or situation, or the combination of these plurality can express.

(4) Since the judgment of whether to transmit the above-mentioned burst signal is made based on the above-mentioned standard and the comparison result of the state of a radio transmission line, the waiting state of the above-mentioned burst signal may be made to reflect in any of the state of the above-mentioned standard and a radio transmission line. In the transmission method of the above-mentioned burst signal, this invention can be constituted from a viewpoint that the waiting state of a burst signal can be easily reflected in the judgment of whether to transmit a burst signal so that the above-mentioned standard may be set to be dependent on the waiting state of transmission of a burst signal. (5) When transmitting data with a burst signal, various performances are required from transmission of the burst signal. In the transmission method of each above-mentioned burst signal, this invention can be constituted from a viewpoint that it can respond properly to such a demand so that the judgment of whether to transmit a burst signal may be further made depending on the performance demanded from transmission of a burst signal.

Thus, since the judgment of whether to transmit a burst signal is dependent on the performance demanded from transmission of the burst signal concerned and is made.

Holding a transmission power value and/or a transmission rate in the most suitable possible state, a burst signal can be transmitted so that the performance demanded may be satisfied. For example, if it is a burst signal of the data of which comparatively quick access speed is required, even if a wireless transfer state is somewhat bad, a burst signal can be transmitted with the transmission power value and/or transmission rate according to the state.

The performance demanded from transmission of the above-mentioned burst signal, It is what expresses the performance demanded when transmitting a burst signal directly or indirectly, For example, either or two or more of those combination, such as access speed demanded, a transmission priority demanded, an error rate demanded, a maximum delay amount demanded, and an average delaying amount demanded, can express.

(6) Since the judgment of whether to transmit the above-mentioned burst signal is made based on the above-mentioned standard and the comparison result of the state of a radio transmission line, the performance demanded from transmission of the above-mentioned burst signal may be made to reflect in any of the state of the above-mentioned standard and a radio transmission line. From a viewpoint that the performance required of the judgment of whether to transmit a burst signal from transmission of a burst signal can be reflected easily, this invention, In the transmission method of the above-mentioned burst signal, it can constitute so that the above-mentioned standard may be set to be dependent on the performance demanded from transmission of a burst signal.

(7) This invention from a viewpoint that the performance demanded from transmission of the above-mentioned burst signal can furthermore distribute power resources properly, In the transmission method of each above-mentioned burst signal, it can constitute so that it may be determined that either [at least] the transmission power value of the burst signal which should be transmitted, or a transmission rate is dependent on the performance demanded from transmission of the burst signal concerned further.

(8) Since a transmission power value and/or a transmission rate are defined based on the state of a radio transmission line from the first when comparing the above-mentioned standard with the state of a radio transmission line, From a viewpoint that processing can be made easy, this invention, The above-mentioned standard is expressed as a standard transmission power value and/or a standard transmission rate, It can constitute so that it may judge whether a burst signal should be transmitted based on a comparison result with the transmission power value

and/or transmission rate which were defined according to the state of this standard transmission power value and/or a standard transmission rate, and the above-mentioned radio transmission line.

(9) In cellular mobile communication, a maximum may be provided in total of the transmission power from one base station for the interference power mitigation to other cells. In this case, the state (for example, the total transmission power value) of two or more radio transmission lines must be taken into consideration. From this viewpoint, this invention can include not only the state of a radio transmission line with the receiving station whose state of said radio transmission line is an address of said transmitting station and the burst signal concerned but the state of the radio transmission line between other receiving stations.

For example, said standard is the standard total power value, and it chooses the burst which can transmit from said two or more burst signals so that total of the transmission power value of two or more burst signals may not exceed said standard total power value. In this selection, when a burst signal is chosen from said two or more burst signals in predetermined order, the sum total of a transmission power value is searched for and this sum total does not exceed said standard total power value, it judges with the selected burst signal concerned being ready for sending.

(10) In order to solve the technical problem mentioned above, this invention, In the sending set in the mobile communication system which transmits a burst signal to the receiving station concerned with the transmission power value and/or transmission rate which were defined according to the state of the radio transmission line between receiving stations, The judging means which judges whether a burst signal should be transmitted based on a comparison result with the state of the radio transmission line between a ready-for-sending non-standard determination means to determine the ready-for-sending non-standard of a burst signal, and the ready-for-sending non-standard determined by this ready-for-sending non-standard determination means and the receiving station concerned. When judged with a burst signal being transmitted in the above-mentioned judging means, it is constituted so that it may have a transmission control means which transmits a burst signal to a receiving station.

(11) In order to solve the technical problem mentioned above furthermore, this invention, In the information distribution method for the moving machine concerned in the mobile communication system which communicates between a base station and a moving machine, 1 or two or more base stations which should communicate with a moving machine are determined, the information which should be distributed to a

moving machine is distributed to 1 or two or more base stations which were determined [above-mentioned], and each base station is constituted so that the distributed information may be transmitted to a moving machine, respectively.

In the information distribution method in such a mobile communication system, the information which should be distributed to a moving machine is distributed to two or more base stations, and the distributed information is transmitted from each base station to a moving machine. Thus, since the information which distributed the information which should be distributed to a moving machine to two or more base stations, and was distributed from each of the base station of this plurality is transmitted to a moving machine, The state of a base station where the information which should be distributed is distributed, the state of the radio transmission line between each base station and moving machine, with which information is distributed, the distributing quantity of information, etc. become possible [changing the mode of distribution of information accommodative] depending on how to carry out distribution of the information which should be distributed.

The number of the base stations which should communicate with the above-mentioned moving machine the arrangement configuration of a base station, and the thing for which it opts fixed beforehand based on the communication traffic etc. which are assumed. Based on the state etc. of the access speed of the communication quality demanded and the information demanded, and the radio transmission line between each base station and a moving machine, it can also change suitably.

(12) From a viewpoint that transmission of information of the state of the radio transmission line between moving machines is attained from a better base station, this invention, In the information distribution method in the above-mentioned mobile communication system, it can constitute so that 1 or two or more base stations which should communicate with the moving machine concerned based on the state of the radio transmission line between moving machines may be determined.

The state of the above-mentioned radio transmission line is what expresses directly or indirectly the transmission state of the electric wave (information) between a moving machine and a base station, For example, the instant path loss variation in the radio transmission line concerned, a data-communications error rate, The distance between a transmission throughput, a moving machine, and a base station, the relative location of a moving machine and a base station, It can express with long section the number of the partner moving machines which are going to transmit from the interference power value from other transmitting stations which a radio transmission

line receives, and the same antenna, desired time, transmitted data amounts or those short section averages or an average, or the combination of these plurality.

(13) When distributing information, various performances are required from distribution of the information. From a viewpoint that it can respond properly to the request to such distribute information, this invention, In the information distribution method in each above-mentioned mobile communication system, it can constitute so that 1 or two or more base stations which should communicate with the moving machine concerned based on the performance demanded from transmission of the information which should be distributed to a moving machine may be determined.

The performance demanded from transmission of the information which should be distributed to the above-mentioned moving machine, It is what expresses directly or indirectly the performance demanded when transmitting information from each base station to a moving machine, For example, either or two or more of those combination, such as access speed demanded, a transmission priority demanded, an error rate demanded, a maximum delay amount demanded, and an average delaying amount demanded, can express.

(14) This invention from a viewpoint that the information which should be distributed to information collected on each base station according to quantity can be distributed properly, In the information distribution method in each above-mentioned mobile communication system, it can constitute so that 1 or two or more base stations which should communicate with the moving machine concerned based on the transmitting waiting state of the information in each base station which should be distributed may be determined.

The transmitting waiting state of the information in each above-mentioned base station which should be distributed, It is what expresses directly or indirectly a waiting state until the information with which each base station was provided is transmitted to a moving machine. For example, the quantity of the information which will be in the state waiting for transmitting, the maximum delay time of the information which will be in a waiting state or average delay of the information which will be in a waiting state, or the combination of these plurality can express.

(15) This invention from a viewpoint that the quantity of the information transmitted from each base station can be reduced when distributing a fixed quantity of information to a moving machine. In the information distribution method in each above-mentioned mobile communication system, it can constitute so that the information which should be distributed to a moving machine may be distributed to two or more determined base stations without duplication.

In the information distribution method in such a mobile communication system. Since the information which should be distributed to a moving machine is distributed to two or more base stations [be / no duplication], when distributing information to a moving machine, the quantity of the information which should be transmitted from each base station is reduced from the quantity of the information concerned in the case of transmitting the information which should be distributed from a single base station. As a result, the air time of the information on each base station at the time of distributing the information concerned to a moving machine is shortened, and the transmitting information to a moving machine becomes difficult to receive the state change of the radio transmission line which may be generated at random from each base station.

(16) From a viewpoint that distribution of information can be ensured to a moving machine, this invention, In the information distribution method in each above-mentioned mobile communication system, it can constitute so that a part or all of information that should be distributed to a moving machine may be reproduced and the a part concerned or all of information that should be distributed may be overlapped and distributed to two or more determined base stations.

In the information distribution method in such a mobile communication system. Since the a part concerned or all of information that should be distributed overlaps and it is transmitted from each base station to a moving machine, even if the quality of the information transmitted to the moving machine from one of base stations deteriorates, the information to which the quality fell is suppliable with the corresponding information transmitted by overlapping from other base stations. As a result, distribution of information can be ensured now to a moving machine.

(17) From a viewpoint of the communications traffic of each base station being equalized and being, this invention, In the information distribution method in each above-mentioned mobile communication system, it can constitute so that more information may be distributed to two or more determined base stations as a base station with little quantity of the information which will be in the state waiting for transmitting.

From a viewpoint that many information can be transmitted to a moving machine via a better radio transmission line from (18), this invention, In the information distribution method in each above-mentioned mobile communication system, to two or more determined base stations, it can constitute so that more information may be distributed as the base station where the state of the radio transmission line between moving machines is better.

That the state of the above-mentioned radio transmission line is better, It is that the

transmission state of the electric wave (information) between a moving machine and a base station is better. For example, with smaller instant path loss variation in the radio transmission line concerned or its short section average value. It can express with each state, like there are few partner moving machines with a smaller interference power value from other transmitting stations where the distance between the moving machine and base station where a transmission throughput with a smaller data-communications error rate is larger is smaller and which a radio transmission line receives which are going to transmit from the same antenna.

(19) This invention from a viewpoint that information can be distributed to a moving machine in the more suitable state in consideration of the communication quality of information, and the distribution time of information, In the information distribution method in each above-mentioned mobile communication system, it can constitute so that the distributing quantity of the information over two or more determined base stations may be decided in each base station based on the quantity of the information which will be in the state waiting for transmitting, and the state of the radio transmission line between moving machines.

The distribution time of information can be presumed with the quantity of the information which will be in the state waiting for transmitting in each above-mentioned base station, and the communication quality of information can be presumed based on the state of the radio transmission line between each base station and a moving machine. Therefore, complexly in consideration of the communication quality of information, and the distribution time of information, the distribute information in a more suitable state becomes possible by deciding the distributing quantity to each base station of the information which should be distributed in each base station based on the quantity of information and the state of a radio transmission line which will be in the state waiting for transmitting.

(20) For example, it can constitute so that the quantity of the information from which it will be in the state waiting for transmitting as the base station where the state of the radio transmission line between moving machines becomes better may increase to two or more determined base stations and information may be distributed. In the information distribution method in such a mobile communication system, the distribute information in a good state of communication quality becomes possible more.

From a viewpoint of enabling it to distribute information to a moving machine earlier than (21), this invention, The information used as the transmitting waiting which can be regarded as there being no chance of being transmitted, in the information distribution method in each above-mentioned mobile communication system can be

collected from each base station, and it can constitute so that it may be considered as the information which should distribute this collected information and may redistribute to 1 or two or more base stations.

By redistributing the information used as the transmitting waiting which can be regarded as there being no chance of being transmitted in each base station to other base stations, the information concerned can be early distributed more now to a moving machine.

Whether it is in the situation as for which other base stations were vacant by time timeout again can perform the judgment of whether there is any chance that the information which serves as waiting for transmission in each base station will be transmitted.

(22) The viewpoint that many information can be duly distributed to a moving machine to this invention, In the information distribution method in the above-mentioned mobile communication system, when the above-mentioned information is collected and the time which was stagnating without transmitting the collected information to a moving machine turns into beyond predetermined time, it can constitute so that the collected information may be canceled.

In the information distribution method in such a mobile communication system, since the information long in each base station which is carrying out time stagnation is canceled, the information provided one by one can be duly distributed to a moving machine.

(23) In order to solve said technical problem furthermore, this invention, In the distribute information control device which performs distribute information control to the moving machine concerned in the mobile communication system which has a base station and a moving machine, A base station determination means to determine two or more base stations which should communicate with a moving machine, It has an information dispensing means which distributes the information which should be distributed to a moving machine to the base station determined by this base station determination means, and it is constituted so that each of each base station can transmit the information distributed in this information dispensing means to a moving machine.

(24) In the receiving set in the mobile communication system with which said technical problem transmits the burst signal transmitted from the transmitting station with the transmission power value and/or transmission rate which were defined according to the state of a radio transmission line, The receiving quality measuring means which measures receiving quality from an input signal, and a receiver reference electrode

determination means to determine a receiver reference electrode according to the measured receiving quality, The receiver ready-for-sending non-judging means which judges whether a transmitting station should transmit a burst signal based on the comparison result of the signal strength detector which detects the state of a radio transmission line, and said receiver reference electrode and the state of a radio transmission line, It is solvable with the sending set in the mobile communication system which has a means to transmit this decision result to a transmitting station. It is measurable not only with a sending set but a receiving set in a radio transmission line. A receiver reference electrode is determined based on the receiving quality measured with the receiving set, and transmission of the burst signal which took the state of the radio transmission line into consideration at the transmitting side is attained by judging whether a burst signal should be transmitted at the transmitting side by a comparison result with the state of a radio transmission line, and sending out to the transmitting side. The transmission control of a higher-precision burst signal becomes possible by considering the result which judged whether the transmitting side should also transmit a burst signal, and also was judged by the above-mentioned receiver.

The best gestalt for inventing An embodiment of the invention is hereafter described based on a drawing.

The mobile communication system with which the transmission method and device of the burst signal concerning an embodiment of the invention are applied is constituted, for example, as shown in drawing 1.

In drawing 1, the information processors (PC) 20, such as a computer, are connected to the mobile stations 10, such as a portable telephone and a PHS terminal. The mobile station 10 performs the base station 30 and radio which were installed in the service area of mobile communications. Similarly, as for other mobile stations 40 to which the information processor (PC) 50 was connected, other base stations 60 and radio are performed. Each base stations 30 and 60 are connected via the predetermined network 80.

When the mobile station 10 is provided with the data which should be transmitted to other information processors 50 from the information processor 20 in such a mobile communication system, for example, the mobile station 10, The data is changed into the form of a packet and wireless transmission is carried out to the base station 30 by making the data of the form of the packet into a burst signal. The base station 30 which received this burst signal sends out each packet concerned to base station 60 at the network 80 based on the transmission destination identifier contained in each

packet. And wireless transmission of the base station 60 which received each of this packet is carried out to the mobile station 40 by making the data formed in each of this packet that received into a burst signal. The mobile station 40 which received this burst signal transmits each packet contained in that burst signal to the information processor 50. This invention is applicable also to the system which used other information generating and an input point, for example, human being's mouth and ear, instead of the information processors 20 and 50.

The transceiver system of the burst signal between the mobile station 10 and the base station 30 in the above mobile communication systems and between the base station 60 and the mobile station 40 is explained in detail as a 1st embodiment of this invention. The first example of this transceiver system is constituted, for example, as shown in drawing 2.

In drawing 2, transmission and reception of a burst signal are made between the sending set 100 formed in the transmitting station side (the mobile station 10 or the base station 60 in the above-mentioned example), and the receiving set 200 formed in the receiving station (the base station 30 or the mobile station 40 in the above-mentioned example).

The sending set 100 to the data taken out with the data drawing machine 102 which takes out the data in which the burst signal (for example, packet format data) provided should be transmitted from the queuing unit 101 accumulated one by one and the queuing unit 101, and the data drawing machine 102 Coding, It has the coding and the modulating amplifier 103 which performs each processing of abnormal conditions and amplification. The transmission line state measuring instrument 104 which measures the state of the radio transmission line between the sending set 100 and the receiving set 200 based on the signal from a communications partner with which this sending set 100 is received via the antenna 110, It has the necessary transmission power presumption machine 105 which presumes the transmission power value of the burst signal which should be transmitted based on the state of the radio transmission line measured with this transmission-line measuring device 104.

The above-mentioned transmission line state measuring instrument 104, for example An instant path loss variation, a data-communications error rate, A transmission throughput, the distance between transceiving equipment, the relative location of transceiving equipment, The interference power value from other radio stations, the number of other radio stations which are going to transmit a signal from the antenna 110, Either transmitting desired time, the data volume which should transmit, those short section averages and a long section average and the combination of these

plurality are outputted as information showing the state of the radio transmission line between the sending set 100 and the receiving set 200. When for example, an instant path loss variation is outputted as information showing the state of the radio transmission line concerned from the transmission line state measuring instrument 104, the necessary transmission power presumption machine 105. For example. the transmission power value that the received power in the receiving set 200 serves as the received power value of choice concerned (constant value) is computed by multiplying the reciprocal of this instant path loss variation by the received power value of choice in the receiving set 200. When an instant path loss variation and interference power value short section average value are outputted as information showing the state of the radio transmission line concerned, the necessary transmission power presumption machine 105, For example, a transmission power value which becomes constant [a received power value versus interference power value ratio] is computed by multiplying the reciprocal of an instant path loss variation by an interference power value short section average value and received power value of choice versus interference power value ratio.

As mentioned above, if the necessary transmission power presumption machine 105 has a worse state of a radio transmission line expressed with the information acquired with the transmission line state measuring instrument 104. it will output a larger transmission power value. and if the state of the radio transmission line is better, it will output a smaller transmission power value.

The sending set 100 has the ready-for-sending non-standard determination machine 106a and the ready-for-sending rejection constant machine 107 further. The ready-for-sending non-standard determination machine 106a calculates the standard transmission power value which serves as a ready-for-sending non-standard based on the information showing the state of the radio transmission line from the transmission line state measuring instrument 104. For example, the information showing the average state of the radio transmission line concerned from the transmission line state measuring device 104. A standard transmission power value calculates based on (for example. the information depending on the distance between transceiving equipment and the information (for example, thing which multiplied the short section average value of the instant path loss variation by constant value) expressed with the short section average of each above-mentioned information). The ready-for-sending rejection constant machine 107 compares the standard transmission power value determined with the ready-for-sending non-standard determination machine 106a with the transmission power value calculated with the

above-mentioned necessary transmission power presumption machine 105, and outputs the control signal of the no of a burst signal ready for sending based on the comparison result. For example, when the transmission power value calculated with the necessary transmission power presumption machine 105 by causes, like phasing falls greatly becomes larger than a standard transmission power value, the transmission permission determination machine 107 supplies the control signal which cannot transmit a burst signal to the data drawing machine 102. On the other hand, the state of a radio transmission line is comparatively good, and when the transmission power value calculated with the necessary transmission power presumption machine 105 becomes below in the above-mentioned standard transmission power value, the transmission permission determination machine 107 supplies the control signal of the transmission permission of a burst signal to the data drawing machine 102.

The data drawing machine 102 controls whether a burst signal is transmitted based on the control signal from the ready-for-sending rejection constant machine 107. That is, while having received the control signal of the transmission permission of a burst signal from the transmission permission determination machine 107, the data drawing machine 102 picks out data from the queuing unit 101, and sends the data to coding and the modulating amplifier 103. Coding and the modulating amplifier 103 perform each processing of coding and abnormal conditions to the data, and it performs amplification processing so that it may become the transmission power value calculated with the necessary transmission power presumption machine 105. And the data processed [this / each] is transmitted from the antenna 110 to the receiving set 200. On the other hand, while having received the control signal which cannot transmit a burst signal from the transmission permission determination machine 107, the data drawing machine 102 interrupts data extraction from the queuing unit 101. As a result, transmission of a burst signal is not made from the sending set 100.

If the state of the radio transmission line between the sending set 100 and the receiving set 200 worsens under the influence of phasing etc., transmission of the burst signal from the sending set 100 to the receiving set 200 will be delayed by the above examples until the state of the radio transmission line is improved. As a result, can reduce peak transmission power, and the power consumption in the sending set 100 is controlled, and the interference to other radio stations can also be reduced.

The second example of a transceiver system in the mobile communication system shown in drawing 1 is constituted, for example, as shown in drawing 3.

In drawing 3, the sending set 100 in this transceiver system (it comprises the sending

set 100 and the receiving set 200), It has the queuing unit 101, the data drawing machine 102, coding and a modulating amplifier 103, the transmission line state measuring instrument 104, the necessary transmission power presumption machine 105, and the ready-for-sending rejection constant machine 107 like the first example mentioned above.

In this second example, the ready-for-sending non-standard determination machine 106b, Based on the state of the burst signal which will be in the information showing the state of the radio transmission line from the transmission line state measuring instrument 104, and the waiting state accumulated in the queuing unit 101, the standard transmission power value used as the standard of burst signal no ready for sending is calculated.

A standard transmission power value is calculated based on the information which expresses the state of the radio transmission line from the transmission line state measuring instrument 104 that the ready-for-sending non-standard determination machine 106b was mentioned above, for example, Based on either the information showing the transmitting waiting state of the burst signal accumulated in the queuing unit 101, for example, the accumulation packet number in the queuing unit 101, its average delaying amount and a maximum delay amount and the combination of these plurality, the above-mentioned standard transmission power value is corrected. For example, if the average delaying amount, maximum delay amount, or accumulation packet number of a burst signal increases more, the standard transmission power value calculated as mentioned above will be enlarged more. As a result, since a burst signal comes to be transmitted even if it is in the state of the radio transmission line which must enlarge some transmission power values, stagnating in the time queuing unit 101 with a long burst signal which should be transmitted is prevented.

The third example of a transceiver system in the mobile communication system shown in drawing 1 is constituted, for example, as shown in drawing 4.

In drawing 4, the sending set 100 in this transceiver system (it comprises the sending set 100 and the receiving set 200), It has the queuing unit 101, the data drawing machine 102, coding and a modulating amplifier 103, the transmission line state measuring instrument 104, the necessary transmission power presumption machine 105, and the ready-for-sending rejection constant machine 107 like the first and the second example which were mentioned above.

In this third example, the ready-for-sending non-standard determination machine 106c, The state of the burst signal which will be in the waiting state accumulated in the information and the queuing unit 101 showing the state of the radio transmission

line from the transmission line state measuring instrument 104, Based on the media information provided from the upper device which becomes the supply origin of the burst signal which should be transmitted, the standard transmission power value used as the standard of burst signal no ready for sending is calculated. Media information is the performance required of transmission of information, for example, required data access speed, an average-transmission-power value, a transmission priority, a necessary error rate, a necessary maximum delay amount, a necessary average delaying amount, etc.

For example, the sending set 100 is provided with multimedia information (a picture, a sound, a character, etc. are included) as information which should be transmitted as a burst signal. And the sending set 100 is provided with information, including the performance required of transmission of the information, for example, required data access speed, an average-transmission-power value, a transmission priority, a necessary error rate, a necessary maximum delay amount, a necessary average delaying amount, etc., as media information with the multimedia information concerned. Ready-for-sending non-standard **** 106c is corrected based on the information and media information showing the transmitting waiting state of the burst signal accumulated in the above-mentioned queuing unit 101 in the standard transmission power value calculated based on the state of a radio transmission line, for example as mentioned above. For example, when required data access speed is large, a desired priority is high, and a necessary error rate is low, in the case where a necessary maximum delay amount and a necessary average delaying amount are small, a standard transmission power value is determined that it will become comparatively large. As a result, even if the multimedia information with such a demand is in the state of the radio transmission line which must enlarge some transmission power values, it can transmit now and transmission of the burst signal adapted to the demand of it is attained.

The fourth example of a transceiver system in the mobile communication system shown in drawing 1 is constituted, for example, as shown in drawing 5.

In drawing 5, the sending set 100 in this transceiver system (it comprises the sending set 100 and the receiving set 200), It has the queuing unit 101, the data drawing machine 102, coding and a modulating amplifier 103, the transmission line state measuring apparatus 104, the necessary transmission power presumption machine 105, and the ready-for-sending rejection constant machine 107 like the first thru/or the third example mentioned above.

In this fourth example, the ready-for-sending non-standard determination machine

106d, The state of the burst signal which will be in the waiting state accumulated in the information and the queuing unit 101 showing the state of the radio transmission line from the transmission line state measuring instrument 104 like the third example mentioned above, Based on the media information provided from the upper device which becomes the supply origin of the burst signal which should be transmitted, the standard transmission power value used as the standard of burst signal no ready for sending is calculated. And the necessary transmission power presumption machine 105 is further provided with the above-mentioned media information.

Based on the information showing the state of the radio transmission line from the transmission line state measuring instrument 104, the necessary transmission power presumption machine 105 so that signal reception may be made in predetermined quality with the receiving set 200, A transmission power value is calculated and the calculated transmission power value is modified based on the media information over the information which should be transmitted.

For example, by the case where a necessary maximum delay amount and a necessary average delaying amount are small, when required data access speed is large, a desired priority is high, and a necessary error rate is low, it is corrected so that a transmission power value may become comparatively large. In this case, in the ready-for-sending non-decision-criteria machine 106d, correction of a standard transmission power value is made based on the media information concerned in consideration of the transmission power value calculated with the necessary transmission power presumption machine 105 being dependent on media information. Namely, the judgment of the no of the burst signal made with the above-mentioned ready-for-sending rejection constant vessel 107 based on the comparison result of the transmission power value determined as mentioned above depending on media information and the standard transmission power value calculated based on the media information concerned ready for sending. The standard transmission power value concerned is determined based on the media information concerned so that transmission of a actual burst signal may not be spoiled.

Since a transmission power value is decided according to the demand to transmission of the information which should be transmitted according to the fourth above example, the power resources of the sending set 100 come to be appropriately distributed according to the demand concerning the transmission of the information which should be transmitted concerned.

The fifth example of a transceiver system in the mobile communication system shown in drawing 1 is constituted, for example, as shown in drawing 6.

In drawing 6, the sending set 100 in this transceiver system (it comprises the sending set 100 and the receiving set 200), It has the queuing unit 101, the data drawing machine 102, coding and a modulating amplifier 103, the transmission line state measuring instrument 104, the necessary transmission power presumption machine 105, and the ready-for-sending rejection constant machine 107 like the first thru/or the fourth example mentioned above. The ready-for-sending non-standard determination machine 106e and the necessary transmission power presumption machine 105 calculate a standard transmission power value and a transmission power value like the fourth example mentioned above based on the above-mentioned multimedia information, respectively.

In this fifth example, the transmission permission standard determination machine 106e, Either or two or more of those combination of the information showing the state of the radio transmission line from the media information provided, the information showing the transmitting waiting state of the burst signal from the queuing unit 101, and the transmission line state measuring instrument 104 are reported to the device of the higher rank which becomes the offer origin of the information which should be transmitted. For example, when this sending set 100 is carried in the mobile station 10 shown in drawing 1, as opposed to the information processor 20, the present transmission error rate and the length of queuing are reported from this ready-for-sending non-standard determination machine 106e. The information processor 20 which received such information can perform control which lowers the transmission priority about transmission of the information on others [**** / raising the transmission priority about transmission of the information which should be transmitted], or lowers required data access speed by lowering communication quality. As a result, satisfying the request for the information from which various performances are requested, there is no delay, and where a peak power is controlled further as much as possible, it can transmit to the receiving set 200 from the sending set 100.

In each above-mentioned example, although the ready-for-sending rejection constant machine 107 was judging no ready for sending with the single reference value (standard transmission power value), the judgment technique is not restricted to it. For example, it may have independently a reference value made into ability ready for sending, and a reference value of which transmission is made improper, and no ready for sending may be judged with a state transition diagram, or no ready for sending may be further judged with a neuro-network. The ready-for-sending rejection constant vessel 107 is provided with the judging standard according to the judgment technique

in such a ready-for-sending non-judging device 107 from the ready-for-sending non-standard determination machine 106a (106b-106e).

In each above-mentioned example, although the transmission power value calculated with the necessary transmission power presumption machine 105 showing the state of a radio transmission line calculated as information based on the state of the radio transmission line is used for the ready-for-sending non-judging device 107, It is not restricted to this but either showing the state of the radio transmission line obtained with the transmission line state measuring instrument 104 of information can also use the arbitrary information acquired based on those information. Also in this case, the transmission power propriety standard determination machine 106a (106b-106e) determines the standard concerned expressed with the information and the information which can be compared which are provided as information showing the state of a radio transmission line.

Next, with reference to drawing 7, the mobile communication system with which the transmission method and device of the burst signal concerning a 2nd embodiment of this invention are applied is explained.

According to a 1st embodiment mentioned above, based on transmission power, the no of the burst signal ready for sending was determined. On the other hand, in addition to transmission power, at a 2nd embodiment, the no of a burst signal ready for sending is determined by referring to the transmission rate of adaptive modulation. The adaptive modulation of the transmission power which transmits to a mobile station from a base station is constant, and means changing a transmission rate (transmission speed). Thereby, when the state of a transmission line worsens, in adaptive modulation, the increase in necessary transmission power can be prevented by lowering a transmission rate. The sending set 100 in the transceiver system (it comprises the sending set 100 and the receiving set 200) shown in drawing 7, It has the queuing unit 101, the data drawing machine 102, coding and a modulating amplifier 103, the transmission line state measuring instrument 104, transmission power and a transmission rate determination machine 105a, and the ready-for-sending rejection constant machine 107a.

Drawing 8 is a figure showing an example of the algorithm of a ready-for-sending rejection constant machine which determines the no of a burst signal ready for sending. The ready-for-sending rejection constant vessel 107a determines a standard transmission rate value according to the state of the above-mentioned radio transmission line while determining a standard transmission power value according to the state and media information of a radio transmission line which the transmission

line state measuring instrument 104 measured (Step S11). That is, the ready-for-sending rejection constant machine 107a possesses the ready-for-sending non-standard determination machine which determines a standard transmission power value and a standard transmission rate value as the inside. The state of the burst signal which will be in the waiting state accumulated in the information and the queuing unit 101 showing the state of the radio transmission line from the transmission line state measuring instrument 104 as the decision processing of the above-mentioned no ready for sending was mentioned above, Based on the media information provided from the upper device which becomes the supply origin of the burst signal which should be transmitted, the standard transmission power value used as the standard of burst signal no ready for sending is calculated. Media information is the performance required of transmission of information, for example, required data access speed, an average-transmission-power value, a transmission priority, a necessary error rate, a necessary maximum delay amount, a necessary average delaying amount, etc.

Next, the ready-for-sending rejection constant machine 107a inputs the transmission power value and transmission rate according to the state and media information of the radio transmission line which were determined with transmission power and the transmission rate determination machine 105a (Step S12). And it is judged whether the ready-for-sending rejection constant machine 107a has a transmission power value lower than a standard transmission power value, and its transmission rate is higher than a standard transmission rate value (Step S13). Lower [a transmission power value] than a standard transmission power value, when a transmission rate is higher than a standard transmission rate value, the ready-for-sending rejection constant vessel 107a outputs the control signal of a burst signal ready for sending to the data drawing machine 102 (Step S14), and ends processing. In being other, a burst signal transmitting failure carries out the control signal of the ready-for-sending rejection constant machine 107a to the data drawing machine 102 (Step S15), and it ends processing.

Thus, since the no of a burst signal ready for sending is determined using both transmission power and a transmission rate according to a 2nd embodiment of this invention. When it corresponds to aggravation of the state of some transmission line by change of a transmission rate and gets worse more, the effect of bigger necessary transmission power reduction can be acquired by postponing transmission.

It is good also as determining the no of a burst signal ready for sending only using a transmission rate. In this case, the blocks 105a and 107a of drawing 7 process only a

transmission rate, and only a transmission rate is processed in Step S11 of drawing 8, S12, and S13.

1st and 2nd embodiments of the above are related with transmission of a single burst signal. That is, a burst signal is transmitted to the one receiving set 200 from the sending set 100. On the other hand, a 3rd embodiment of this invention explained below performs no of two or more burst signals ready for sending unitary. That is, as for a 3rd embodiment, two or more burst signals manage the no of two or more above-mentioned burst signals ready for sending unitary in the system which has the information which shows an address (transmission destination receiving set), and transmits it to two or more corresponding receiving sets, respectively.

Drawing 9 is a block diagram showing a 3rd embodiment of above-mentioned this invention. The sending set 100 in the transceiver system (it comprises the sending set 100 and receiving set $200_1 - 200_M$) shown in drawing 9, It has the queuing unit 101, the data drawing machine 102, coding and a modulating amplifier 103, the transmission line state measuring instrument 104, transmission power and a transmission rate determination machine 105a, and the ready-for-sending rejection constant machine 107a. This block configuration itself is the same as the block configuration of the sending set 100 shown in drawing 7. However, the sending set 100 of drawing 9 is the point of explaining below, and differ in the sending set 100 shown in drawing 7.

The queuing unit 101 can accumulate N burst signals supplied from an upper device. That is, the queuing unit 101 has N queuing. The sending set 100 can transmit a corresponding burst signal to M receiving set $200_1 - 200_M$. That is, each burst signal has the information which shows the number of an address, respectively. Each receiving set $200_1 - 200_M$ incorporate the transmission burst addressed to a local station via each antenna $210_1 - 210_M$.

In cellular mobile communication, a maximum may be provided in total of the transmission power from one base station for the interference power mitigation to other cells. In order to realize this, it is determined that the ready-for-sending rejection constant machine 107a does not exceed the threshold as which total of the transmission power from the transmitting side antenna 110 determined beforehand the group of the transmission permission burst to reference by the transmission power of each burst signal.

This example of a way to define is explained below.

The burst signal is seen in predetermined order, and if a transmission permission is given and exceeded to the burst signal when total of transmission power does not exceed a threshold, even if it adds the media, let a burst signal be transmitting

disapproval. This is performed about all the media. Predetermined turn is decided based on either or two or more combination from queuing, media information, the transmission line state measuring instrument 104, and transmission power and a transmission rate determination machine 105a. The example of predetermined turn is shown below.

** See in an order from the small media of transmission power.

** See in an order from the big media of transmission power.

** See in an order from the big media of queuing length.

** See in an order from the small media of a stale demand based on media information.

** What multiplied the value of transmission power by the short section average value of the instant path loss sees in an order from small media.

** See in an order from media with a big transmission rate.

** See from the burst signal which received the better judgment by receiver ready-for-sending un-judging (it mentions later).

The example by the turn of the above-mentioned ** is shown. Now, the threshold of total [severalN of a burst signal] of N= 4 and transmission power [respectively / (it is considered as the burst signals 1, 2, 3, and 4)] of 0.5, 5, 3 and 6, and transmission power is set to 10. It is as follows when it sees in the big order of transmission power. First, transmission power chooses the largest burst signal 4 (transmission power 6). Since total of transmission power is 6, it is less than the threshold 10. Therefore, transmission of the burst signal 4 is permitted. Next, the transmission power 5 of the burst signal 2 to the 2nd with large transmission power is applied to the transmission power 6. Total of the transmission power in this case is 11, and exceeds a threshold. Therefore, transmission of the burst signal 2 is not permitted. Next, the transmission power of the burst signal 3 to the 3rd with large transmission power is applied to the transmission power 6. Total of the transmission power in this case is 9, and is less than a threshold. Therefore, in addition to the burst signal 4, transmission of the burst signal 3 is newly permitted. Next, the transmission power 0.5 of the burst signal 1 to the 4th with large transmission power is applied to the transmission power 9 (total of the transmission power of the burst signals 4 and 3). Total of the transmission power in this case is 9.5, and is less than a threshold. Therefore, in addition to the burst signals 4 and 3, transmission of the burst signal 1 is newly permitted.

The no of a burst signal ready for sending is determined not only in consideration of the receiving set used as the address of this burst signal but in consideration of the state (expressed as transmission power or a transmission rate) of transmission of the burst signal to other receiving sets, i.e., other radio transmission lines, as above. Total

of transmission power may be total of a momentary transmission power value, and may be the average value of total within a certain fixed time.

Drawing 10 is a figure showing an example of an algorithm which determines the no of two or more burst signals which can be set in the ready-for-sending rejection constant vessel 107a shown in drawing 9 ready for sending unitary. While the ready-for-sending rejection constant vessel 107a determines the standard total transmission power value according to the state (radio transmission line which connects the sending set 100, receiving set 200_1 ~ 200_M, respectively) and media information of each radio transmission line which the transmission line state measuring instrument 104 measured, A standard transmission rate value is determined according to the state of each above-mentioned radio transmission line (Step S21). A standard transmission rate is decided for every (every burst signal) radio transmission line. The state of a burst signal where the standard total power value will be in the waiting state accumulated in the information and the queuing unit 101 showing the state of each radio transmission line from the transmission line state measuring instrument 104. It is decided based on the media information provided from the upper device which becomes the supply origin of the burst signal which should be transmitted, and becomes a standard of burst signal no ready for sending. Media information is the performance required of transmission of information, for example, required data access speed, an average-transmission-power value, a transmission priority, a necessary error rate, a necessary maximum delay amount, a necessary average delaying amount, etc.

Next, the ready-for-sending rejection constant machine 107a inputs each transmission power value (greatest transmission power value) and transmission rate (minimum transmission rate) of N burst signals according to the state and media information of each radio transmission line which were determined with transmission power and the transmission rate determination machine 105a (Step S22). And the ready-for-sending rejection constant machine 107a rearranges N burst signals into the beforehand fixed turn (Step S23). Next, the ready-for-sending rejection constant machine 107a sets the initial value 0 as the parameter S which shows total of transmission power (Step S24). And the ready-for-sending rejection constant machine 107a chooses the burst signal in the head of the rearranged burst signal, and execution of the propriety determination loop which consists of step S26-28 is started (Step S25).

It is judged whether the transmission power value which applied the transmission power of the burst signal which the ready-for-sending rejection constant vessel 107a

had the transmission rate value of the selected burst signal larger than the standard transmission rate value, and was chosen as the parameter S (set as 0 at first) is less than the standard total power value (Step S26). When this decision result is YES, the transmission power value of the selected burst signal is applied to S, and the value of the parameter S is updated (Step S27). And the ready-for-sending rejection constant machine 107a outputs the control signal of a burst signal transmission permission to the data drawing machine 102 (Step S28), and execution of the propriety determination loop over the selected burst signal is ended (Step S29). On the other hand, when the decision result of Step S26 is NO, the ready-for-sending rejection constant vessel 107a outputs the control signal for which burst signal transmission is improper to the data drawing machine 102 (Step S30). And the following burst signal is chosen and the propriety determination loop which consists of Steps S26-S28 is executed.

When the decision result of Step S26 is NO, a propriety determination loop is ended (Step S29).

Thus, all the burst signals judged to be YES(s) at Step S26 become ready for sending, and the sum of such transmission power does not exceed the standard total power value. Therefore, in cellular mobile communication, the interference power to other cells is mitigable.

Next, with reference to drawing 11, the queuing unit 101 used by the 1st to 3rd embodiment of this invention is explained.

The queuing unit 101 shown in drawing 11 has the time information addition machine 111, the waiting memory 112 for transmission, the time difference part computer 113, the current time generator 114, the maximum delay time / average delay computer 115, and the delay maximum / average value / n-% value computer 116. The inputted burst signal is kept by the waiting memory 112 for transmission after current time information is added to every transmitting unit (for example, packet length) with the time information addition machine 111. One transmitting unit of the burst signals which store the waiting memory 112 for transmission if it takes out from the data drawing machine 102 and a requirement signal comes (what arrived at the earliest time may be used, and) 1 transmitting unit important when the difference of the importance of information is in a single burst signal -- you may also choose -- it chooses and sends to the transmitting difference computer 113. The transmitting difference computer 113 calculates the difference value of the time information and current time which were added to this while sending the inputted transmitting unit to the data drawing machine 102. As for a difference value, the delay maximum / average

value / n-% value is calculated by the delay maximum / average value / n-% value computer 116, and this information is sent to the ready-for-sending rejection constant machine 107a.

The waiting memory 112 for transmission calculates the quantity of the burst signal which self stores, and has the function to send this to the ready-for-sending rejection constant vessel 107a as amount information of waiting burst signals for transmission. The waiting memory 112 for transmission has the function to send a part or all of time information that was added per transmission of the burst signal which self stores to maximum delay time / average delay computer 115. Maximum delay time / average delay computer 115 calculates this maximum/average delay, and has a function sent to the ready-for-sending rejection constant machine 107a.

In drawing 11, when the queuing unit 101 is constituted from a smallest part article, the component to which (*) was given can be omitted.

In the 1st to 3rd embodiment of above-mentioned this invention, it judges whether the ready-for-sending non-standard determined as mentioned above by comparison with the communication quality demanded and actual communication quality is proper, and can update periodically. The procedure of this judgment is shown in the flow chart of drawing 12. The ready-for-sending rejection constant vessels 107 and 107a mentioned above perform the flow chart to illustrate.

It is not concerned with the existence of transmission of data, but a ready-for-sending non-standard is updated with a constant period.

The following explanation explains on account of explanation as processing of the ready-for-sending rejection constant vessel 107a of a 3rd embodiment of this invention.

First, it is judged whether the ready-for-sending rejection constant machine 107a determined the standard transmission power value and the standard transmission rate value as mentioned above (Step S71), and became an updating period (Step S72). When the decision result of Step S72 is NO, the ready-for-sending rejection constant vessel 107a ends processing. On the other hand, when the decision result of Step S72 is YES, the latest transmission line state is inputted (Step S73). Specifically, the things (for example, average delay, average transmission, etc.) in connection with the quality of burst signal transmission are measured with the transmission line state measuring instrument 104 among fixed time and a transmission line state. And it is judged whether the ready-for-sending rejection constant machine 107a had the proper standard transmission power value and standard transmission rate value which were determined at Step S71 last time (Step S74). In Step S74, by what (Step S75,

S76) the result measured at Step S73 is changed for as compared with a necessary transmission line state by the width which established the ready-for-sending non-standard beforehand according to it, a ready-for-sending non-standard can be changed accommodative, and necessary quality can be acquired. For example, in the case of the burst signal which set to a average delay demanded by media information, fixed time and average delay are measured and this judges whether it goes into the range (a1, a2) (a1 and a2 are the constants defined beforehand, and they are a1<a<a2) which is the range defined beforehand. If average delay is this within the limits, a change of a standard transmission value will not be made. Since it will be thought that the opportunity of a transmission permission is given more than needed if average delay is below a-s, in order to make a standard severe, either [raising the standard transmission rate value which lowers a standard transmission power value], or both are performed. If average delay is more than a+s, either [lowering the standard transmission rate value which raises standard transmission power], or both will be performed. It may be made to change according to the grade of deviation from the range which the change width of the standard transmission value could be constant, and was defined beforehand.

Here, Tp is made into a standard transmission power value, and Tr is made into a standard transmission rate value, make deltap into the updating width of a standard transmission power value, and let deltar be the updating width of a standard transmission rate value. At Step S74, and/or the standard transmission power value was too low, when it is judged that a standard transmission rate value is too high, Tp+delta p is set as Tp and Tr-delta r is set as Tr. On the other hand, and/or the standard transmission power value was too high, when it is judged that a standard transmission rate value is too low, Tp-delta p is set as Tp and Tr+delta r is set as Tr. When it is judged at Step S74 that it is suitable, a change of a standard transmission value is not made.

According to the 1st to 3rd embodiment of above-mentioned this invention, based on the transmission line state measured at the transmitting side, the transmitting side is performing ready-for-sending un-judging. However, ready-for-sending un-judging is not limited to the composition performed based on the transmission line state measured at the transmitting side, and it can also perform it by transmitting to the transmitting side by making into a control signal what was observed by the receiver. When observing by a receiver, the measured value can also be transmitted to the transmitting side as a control signal in the form of the real number etc. as it is, and this can be judged based on the standard established by the receiver, and it can also

transmit to the transmitting side as receiver ready-for-sending un-judging [which was expressed as a binary or a numerical value of the limited stage beyond it].

Hereafter, the example of composition of the receiving set in the case of transmitting receiver ready-for-sending un-judging to the transmitting side with reference to drawing 13 is explained.

Drawing 13 is a block diagram showing the example of 1 composition of the receiving set 200 in the transceiver system in the mobile communication system of the 1st to 3rd embodiment of this invention mentioned above. In the figure, the receiving set 200 possesses channel separation and recovery / decryption machine 221, the receiving quality measuring instrument 222, the receiver reference electrode determination machine 223, the signal strength detector 224, control signal abnormal conditions and an amplifier 225, and the burst signal output terminal 226.

In order to measure a transmission line state with the receiving set 200, the signal for intensity detection is sent out with the receiving set 200 from the sending set 100 with the transmission power value which is known. The signal strength detector 224 of the receiving set 200 can detect this intensity detecting signal, and a transmission power value can also use what kind of signal which is known. For example, a common channel (common channel) may be used from one sending set to two or more receiving sets, and an individual channel may be used [single] to each receiving set. By using a common channel, one signal for intensity detection can be shared with all the receiving sets, and electric power utilization efficiency can be raised. It may always be transmitted irrespective of the existence of the burst signal which should be transmitted, and only when there is a burst signal which should be transmitted, it may transmit. By transmitting, only when there is data which should be transmitted, processing of an unnecessary receiving set and sending out of a control signal can be prevented at time without the burst signal which should be transmitted. It may be transmitted continuously and the signal for intensity detection may be transmitted to a discontinuous target (cycle aperiodic). By transmitting the signal for intensity detection continuously, a transmission line state can be presumed now at arbitrary time by a receiver. The signal for intensity detection may be a signal (pilot signal) for exclusive use for intensity detection, and may serve as transmission of a control signal and a burst signal.

In the composition shown in drawing 13, the receiving quality measuring instrument 222 measures the transmission line state which the processing process and processing result of a data channel input signal in channel separation and recovery / decryption machine 221 show. The receiver reference electrode determination

machine 223 determines a receiver reference electrode based on the reference electrode of a measurement result and the past. For example, the n % value (value that n% of receiving burst signal total is less than this value) of the time delay of a receiving burst signal is measured periodically, if the measurement result is larger than the target time delay defined beforehand --- a receiver reference electrode --- it or before --- fixed price reduction --- if it comes out other than this and is --- a receiver reference electrode --- it or before --- constant value ****** --- it can do like.

The signal strength detector 224 of the receiving set 200 presumes a transmission line state, and the receiver ready-for-sending non-judging device 225 compares this with a receiver reference electrode. A comparison result may be both difference and may change this into the numerical value of the limited stage of corresponding by the range to which the value belongs. Control signal abnormal conditions and the amplifier 226 transmit towards a sending set via the antenna 210 by making a comparison result into a control signal. A comparison result may transmit, whenever receiver ready-for-sending un-judging in the receiver ready-for-sending non-judging device 225 is generated, and only when it changes from the comparison result sent out immediately before, it may be sent out. For example, when transmitting receiver ready-for-sending un-judging as information on a binary, sending out of the high control signal of line error tolerance is possible by sending out the judgment periodically. Or a control signal amount is reducible by sending out information only in the place which the judgment reversed.

It can perform ready-for-sending un-determining [which also considered the standard of the transmission line state defined by the receiver] by using this as a part of standard ready for sending of the not judging, with the ready-for-sending rejection constant vessels 107 and 107a in the sending set 100. Or it can have composition which determines no ready for sending with a receiving side device equivalent by using as it is receiver ready-for-sending un-judging [which was expressed for the numerical value of the binary] as ready-for-sending un-judging with the ready-for-sending rejection constant vessel in a sending set.

Drawing 14 is a flow chart which shows operation of the sending set 100 used by 2nd and 3rd embodiments of this invention mentioned above. First, the ready-for-sending rejection constant machine 107a judges the existence of the burst signal in the queuing unit 101 (Step S31). When this decision result is YES, transmission power and the transmission rate determination machine 105a. As data and media information about a transmission line state are incorporated from the transmission line state measuring instrument 104 (Step S32) and Step S12 of drawing 8 and Step S22 of

drawing 10 explained, transmission power and a transmission rate are determined. And the ready-for-sending rejection constant vessel 107a determines no ready for sending according to the algorithm shown in drawing 8 or drawing 10 (Step S34). The ready-for-sending rejection constant vessel 107a controls the data drawing machine 102, takes out the burst signal with which transmission was permitted from the queuing unit 101, and gives it to coding and the modulating amplifier 103 (Step S35). Coding and the modulating amplifier 103 perform coding of the burst signal with which transmission was permitted, abnormal conditions, and amplification (Step S36), and transmits a burst signal via the antenna 110 (Step S37).

The flow chart of drawing 14 also shows the send action of the sending set 100 used by a 1st embodiment of this invention. However, a 1st embodiment does not use the transmission rate only using transmission power.

The 1st to 3rd embodiment of above-mentioned this invention is applicable to the distribute information control in a mobile communication system. Hereafter, an example of the mobile communication system with which the information distribution method and distribute information control device to a moving machine are applied is explained as a 4th embodiment of this invention.

Drawing 15 is a block diagram showing a 4th embodiment of this invention. In drawing 15, the information processors (PC) 20, such as a computer, are connected to the moving machines (MS) 10, such as a portable telephone and a PHS terminal. The moving machine 10 becomes possible [base station 100_1 installed in the service area of mobile communications, 100_2, ---, performing 100_n and radio]. Each base station 100_1, 100_2, ---, 100_n are connected to the control station 40. The control station 40 relays communication between each base station (BS) 100_1, 100_2, ---, each base station and the network 50 that 100_n is controlled and communicate with the moving machine 10.

In particular, it gets down, and the control station 40 is distributed and transmitted in communication of a direction to the base station determined in accordance with a method which mentions the data addressed to moving machine 10 later from the network 50. This control station 40 is supervising each base station 100_1, 100_2, ---, 100_n.

It also has the function which collects the data judged that there is no transmitting ** for the time being from each base station, and is again distributed to other base stations.

In the above-mentioned mobile communication system, the control station 40, each

base station 100_1, 100_2, ---, 100_n are constituted, for example, as shown in drawing 16

First, with reference to the flow chart of drawing 16 and drawing 18, the composition and operation of the control station 40 are explained.

The control station 40 has the time additional unit 41, the data transmission base station determination machine 42, the data distributor 43, the non-send data reclaimer 44, and the data cancellation judging device 45. The basic control sequence of the control station 40 is as being shown in drawing 18 (A). When it judges whether there is any data which should be distributed (Step S41) and judged as **, the control station 40 is carried out like drawing 18 (B), distributes data (Step S42), and it follows it to Step S43. When it is judged that there is no data which should be distributed at Step S41, it progresses to Step S43 directly. When it is judged that there is data which should be collected at Step S43, the control station 40 is carried out like drawing 18 (C), collects non-send data (Step S44), and ends processing. When it is judged that there is no data which should be collected at Step S43, the control station 40 ends processing.

Next, each component of the control station 40 is explained in detail.

The time additional unit 41 adds the receipt time (time stamp) to the data (packet) with which moving machine 10 is provided from the network 50 (Step S51). The data transmission base station determination machine 42 determines the base station which should transmit data to the moving machine 10 in accordance with a technique (Step S52) which is mentioned later (Step S53). The data distributor 43 distributes the data in which the receipt time was added as mentioned above to the base station determined with the data transmission base station determination machine 42 (Step S54).

In this system, since data can be transmitted towards the moving machine 10 from two or more base stations, the quantity per unit time of the data with which the control station 40 is provided via the network 50 may be over the quantity per unit time of the data which the transmitter of each base station can transmit. The unit data length (unit packet number) of the data distributed as mentioned above may be the same as that [unit] of the data provided from the network 50, or may differ.

The non-send data reclaimers 44 are collected as a packet without a chance that the packet which is not transmitted beyond as for fixed time gone into the queuing unit 120 of each base station will be transmitted (Step S61). Or when an opening arises in other base stations (queuing was vacant), packets can be collected, or these packets can be collected in consideration of the both sides of the idle status of the

above-mentioned time and other base stations. It is judged whether the packet collected by this non-send data reclaimer 44 should be canceled by the data cancellation judging device 45 (Step S62). This judgment is performed based on the holding time calculated based on the receipt time and current time which were added to each packet. That is, the packet is canceled when the holding time is beyond predetermined time (Step S64). The packet which was not canceled is returned to the data distributor 43, and is redistributed to each base station determined with the data transmission base station determination machine 42 at the time (Step S63).

It comprises the sending set 100 by an each base station 100_1, 100_2, ---, the 1st to 3rd [that 100_n mentioned above] embodiment. Drawing 16 shows only the queuing unit 101 and the transmission line state measuring instrument 150 among the components mentioned above for convenience, and has shown the remaining components as the transmitter 121. That is, each base station 100_1, 100_2, ---, when 100_n has the composition of drawing 6. The transmitter 121 of each base station has the data drawing machine 102 explained with reference to drawing 6, coding and a modulating amplifier 103, the necessary transmission power presumption machine 105, the ready-for-sending non-standard determination machine 106e, and the ready-for-sending rejection constant vessel 107, as shown in drawing 17. Each base station 100_1, 100_2, ---, when 100_n has the composition of drawing 7. The transmitter 121 of each base station has the data drawing machine 102 shown in drawing 7, coding and a modulating amplifier 103, transmission power and a transmission rate determination machine 105a, and the ready-for-sending rejection constant machine 107a.

The queuing unit 101 stores the data transmitted from the control station 40 in a packet unit one by one. The sending set 100 takes out the data stored in the queuing unit 120 in transmit timing, and carries out wireless transmission of the data from the antenna 110 to the moving machine 10.

The above-mentioned transmission line state measuring instrument 104 measures the state of the radio transmission line between the receiving sets 200 of the transmitter 121 and the moving machine 10. As mentioned above, as information showing the state of this radio transmission line For example, the instant path loss variation between transmitter-receivers, A data-communications error rate, a transmission throughput, the distance between transmitter-receivers, the relative location of a transmitter-receiver, Long section the number of other moving machines which should transmit data, desired time, data volume or these short section average value or average value, or the combination of these plurality can be used from the

interference power value which the receiving set 200 receives from the transmit radio wave from other transmitting stations, and the antenna 110.

The transmitter 121 is provided with the transmission line information showing the state of the radio transmission line measured with the transmission line state measuring instrument 104, and it is transmitted to the data transmission base station determination machine 42 of the above-mentioned control station 40. The transmitter 121 transmits with the electric power which determined transmission power and transmit timing based on this transmission line information, took out the data in the queuing unit 101 to that transmit timing, and was determined as it, when it has the composition by a 1st embodiment mentioned above, for example.

The data by which wireless transmission is carried out as mentioned above from each base station is received by the receiving set 200 via the antenna 210 in the moving machine 10. It is further transmitted to the information processor 20, and this received data is processed with this information processor 20.

The above-mentioned control station 40 distributes as follows the data of addressing to moving machine 10 provided from the network 50 to each base station.

The media information provided with the data transmission office determination machine 42 from the network 50 with data, The above-mentioned transmission line information provided from each base station 100_1 ~ 100_n, Based on the information (queuing information) showing the state of the waiting for transmission of the data in each queuing unit 101 provided from each base station 100_1 - 100_n, the base station which should transmit the data addressed to moving machine 10 provided to the moving machine 10 concerned is determined.

The above-mentioned transmission line information expresses the degree (attenuation is [with little interference with few error rates with few path losses] small) to which the state of the radio transmission line between each base station and the moving machine 10 is suitable for radio. Based on such transmission line information, the data transmission determination machine 42 can choose the base station which is in the state where the state of the radio transmission line between the moving machines 10 was more suitable for radio.

The packet number of the data stored in the queuing unit 101, its maximum delay time or average delay, or the combination of these plurality is used as the above-mentioned queuing information, for example. Based on such queuing information, the rough transmission waiting time of the distributed data can be judged.

The media information with which the data transmission base station determination machine 42 is provided as mentioned above, It is the information showing the

performance required of transmission of the data provided. For example, it comprises transmitting permissible a required data transfer rate, a transfer priority, a necessary error rate, a necessary maximum delay amount, a necessary average delaying amount or base station information (group of a base station (for example, three games) allowed transmission about each communication), or combination of these plurality.

The above-mentioned data transmission base station determination machine 42 determines 1 or two or more base stations which can perform data transmission to the moving machine 10 where the performance expressed with media information complexly in consideration of the above-mentioned transmission line information, queuing information, and media information is satisfied as much as possible. The algorithm for determining this base station can be defined arbitrarily. For example, to each base station, transmission line information, queuing information, and media information are evaluated, the suitable degree as a transmitting base station is calculated, and the base station of the higher rank predetermined number (three base stations) of the suitable degree is determined as a base station which performs communication with a moving machine.

The result as which a base station is determined based on such a suitable degree. For example, when the data which should be urgently transmitted to the moving machine 10 is provided (when required data access speed is large), A base station with little waiting time within the queuing unit 101 is preferentially chosen as a transmitting base station, When the data which should think quality as important and should be transmitted to the moving machine 10 is provided, a base station with the sufficient state of the radio transmission line between the moving machines 10 is preferentially chosen as a transmitting base station (when a necessary error rate is small).

If two or more base stations which should transmit data to the moving machine 10 with the data transmission base station determination machine 42 as mentioned above are determined, the data distributor 43 will distribute the data provided to two or more of the determined base stations, and will transmit.

The decision algorithm of the base station used as the distribution destination of this data can be decided arbitrarily.

For example, when it gives priority to transmitting data to the moving machine 10 certainly, some or all of the data which should be transmitted is reproduced, it overlaps and some or all of the data can be distributed to two or more base stations. When it gives priority to transmitting data to the moving machine 10 as soon as possible, the data which should be transmitted can be divided and the divided data can be distributed to each base station without duplication.

The distributing quantity to each base station of the data distributed by the data distributor 43 may be distributed with a fixed rate in order of the suitable degree calculated about the base station which may distribute uniformly and is determined as mentioned above. It may be made to decide the distributing quantity of the data to each base station based on either of the queuing information and transmission line information which are provided, or those combination from each above-mentioned base station. For example, the distributing quantity of data can be decided that the quantity of the data in which the state of the radio transmission line between the moving machines 10 is accumulated into the queuing unit 101 of a better base station increases more.

Each base station which received the data distributed as mentioned above transmits the data to the moving machine 10 used as an address. Thus, in the process in which transmission (distribution) of data is made from each base station to the moving machine 10, the non-send data reclaimer 44 inspects the waiting data (packet) in the queuing unit 101 of each base station, and collects the data as for which beyond predetermined time stagnates in the queuing unit 101. Or also when an opening is made in other base stations, data can be collected, or data can also be collected in consideration of the both sides of the idle status of the above-mentioned time and other base stations. And whether it should be canceled by the data cancellation judging device 45 redistributes the collected packet to 1 or two or more base stations where the data distributor 43 was determined with the data transmission base station determination machine 42 at the time about the packet did not judge that it should be judged and canceled.

The packet from which the holding time acquired from the receipt time and current time turns into beyond predetermined time on the other hand is canceled from a viewpoint of giving priority to distributing other data without delay.

As it explained [above-mentioned], according to a 4th embodiment of this invention, the base station which communicates with a moving machine based on queuing information, transmission line information or media information, or the combination of these plurality is determined, and. Further in [the amount of distribution of the data to the determined base station is determined, and] each base station, Since the transmit timing of data is made to be controlled based on either or those combination of the above-mentioned queuing, transmission line information, and media information, when distributing information to a moving machine, the moving machine can receive the distributed information in the better state.

As mentioned above, since the transmission period (should a burst signal be

transmitted or not?) of a burst signal is determined in consideration of the state of a radio transmission line according to the invention in this application as explained, When transmitting a burst signal, the transmission period of the burst signal concerned can be determined so that both a transmission power value, and both [either or] which are defined according to the state of the radio transmission line may become as unsuitable for a mobile communication system as possible.

In this invention, the information which the information which should be distributed to a moving machine was distributed to two or more base stations, and was distributed from each of the base station of this plurality is transmitted to a moving machine.

Therefore, the state of a base station where the information which should be distributed is distributed, the state of the radio transmission line between each base station and moving machine, with which information is distributed, the distributing quantity of information, etc. become possible [changing the mode of distribution of information accommodative] depending on how to carry out distribution of the information which should be distributed.

As a result, even if it determines the base station which communicates with a moving machine a comparatively long cycle, the distribute information in a more suitable mode becomes possible depending on how to carry out distribution of the information (even if it lengthens the cycle of measurement of a transmission line). Therefore, lessening the controlled variable concerning distribute information as much as possible, distribution of the information on the moving machine concerned is attained by reception of the information on a moving machine so that may be made in the best possible state.

[Brief Description of the Drawings]

Drawing 1 is a block diagram showing the example of composition of the mobile communication system with which the transmission method and device of the burst signal concerning an embodiment of the invention are applied.

Drawing 2 is a block diagram showing the first example of a transceiver system in the mobile communication system by a 1st embodiment of this invention.

Drawing 3 is a block diagram showing the second example of a transceiver system in the mobile communication system by a 1st embodiment.

Drawing 4 is a block diagram showing the third example of a transceiver system in the mobile communication system by a 1st embodiment.

Drawing 5 is a block diagram showing the fourth example of a transceiver system in the mobile communication system by a 1st embodiment.

Drawing 6 is a block diagram showing the fifth example of a transceiver system in the

mobile communication system by a 1st embodiment.

Drawing 7 is a block diagram showing the transceiver system in the mobile communication system by a 2nd embodiment of this invention.

Drawing 8 is a flow chart which shows operation of the ready-for-sending rejection constant vessel shown in drawing 7.

Drawing 9 is a block diagram showing the transceiver system in the mobile communication system by a 3rd embodiment of this invention.

Drawing 10 is a flow chart which shows operation of the ready-for-sending rejection constant vessel shown in drawing 9.

Drawing 11 is a figure showing the example of 1 composition of the queuing unit used by an embodiment of the invention.

Drawing 12 is a flow chart which shows the algorithm which determines a ready-for-sending non-standard in an embodiment of the invention also reflecting the last standard transmission value.

Drawing 13 is a block diagram showing the example of 1 composition of the receiving set of composition of transmitting receiver ready-for-sending un-judging to a sending set in an embodiment of the invention.

Drawing 14 is a flow chart which shows operation of the sending set used by an embodiment of the invention.

Drawing 15 is a block diagram showing the fundamental example of composition of the mobile communications system with which the 4th information distribution method and distribute information control device by an embodiment of this invention are applied.

Drawing 16 is a control station in the mobile communications system shown in drawing 15 which gets down and starts communication of a direction, a base station, and a block diagram showing the composition of a moving machine.

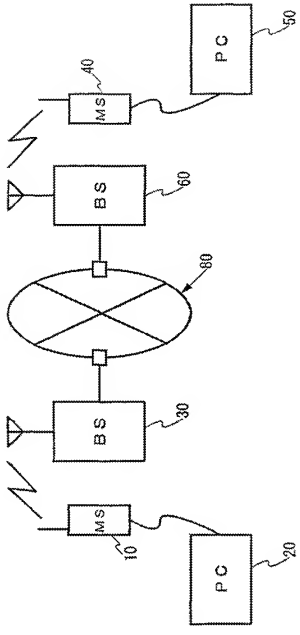
Drawing 17 is a figure showing the example of composition of each base station shown in drawing 15 and drawing 16.

Drawing 18 is a flow chart which shows operation of the control station shown in drawing 15 and drawing 16.

DRAWINGS

[Drawing 1]

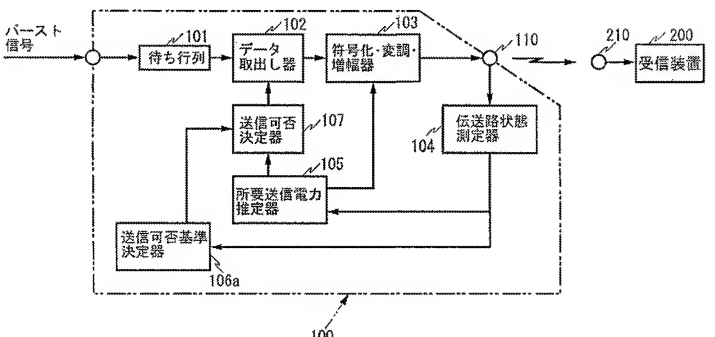
FIG. 1



[Drawing 2]

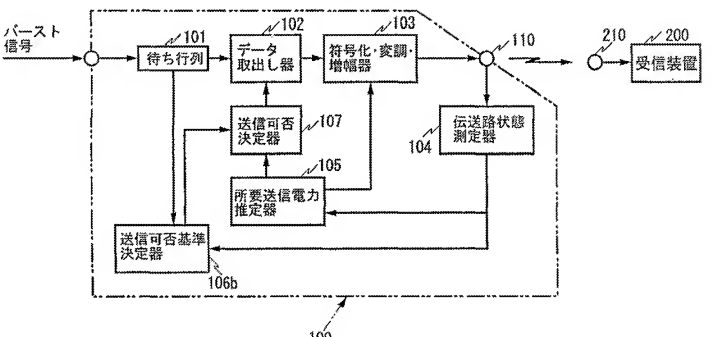
[Drawing 3]

FIG. 2



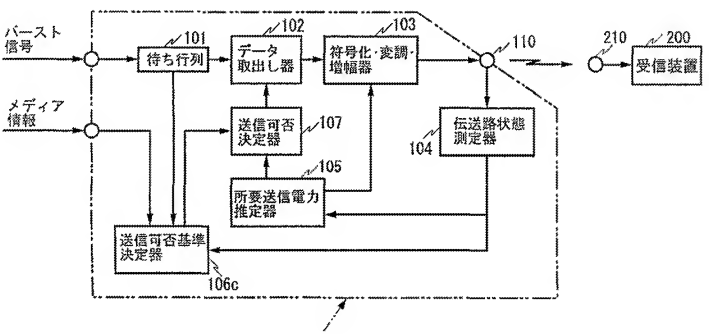
[Drawing 4]

FIG. 3



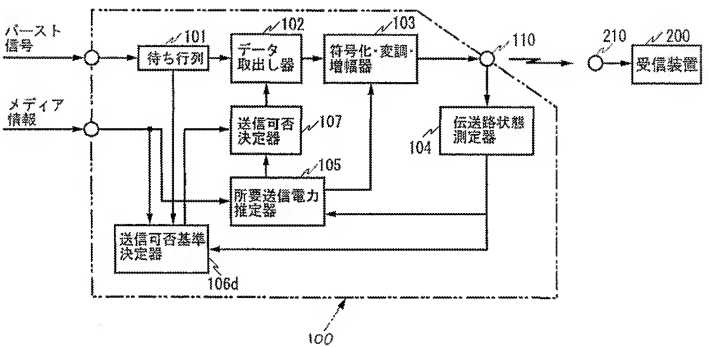
[Drawings 5]

FIG. 4



[Drawing 6]

FIG. 5



[Drawing 7]

FIG. 6

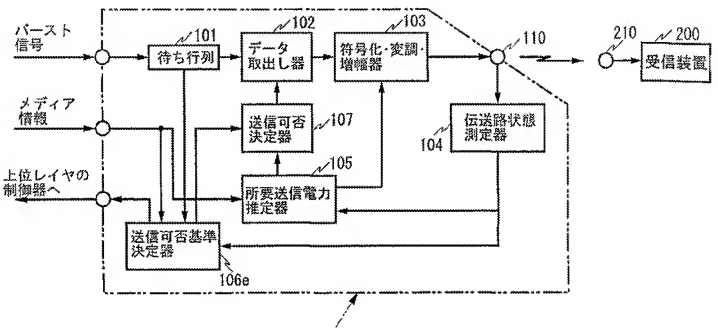
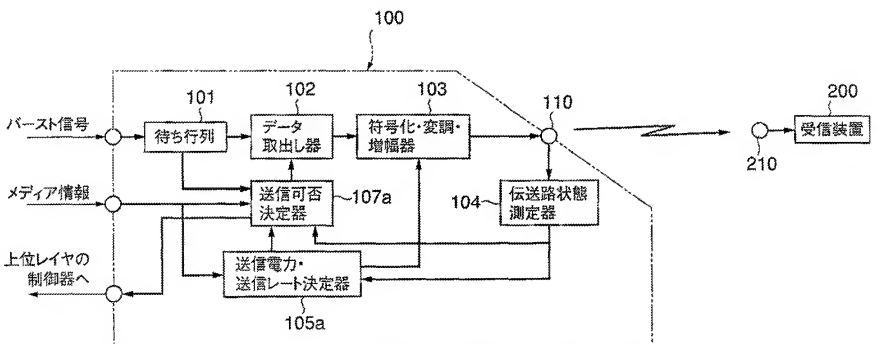
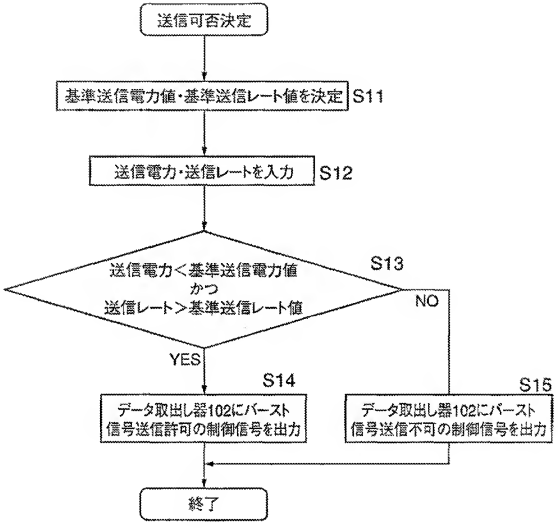


FIG.7


100
101
102
103
110
200
バースト信号
待ち行列
データ
取出し器
符号化・変調・
増幅器
受信装置
210
メディア情報
送信可否
決定器
107a
104
伝送路状態
測定器
上位レイヤの
制御器へ
送信電力・
送信レート決定器
105a

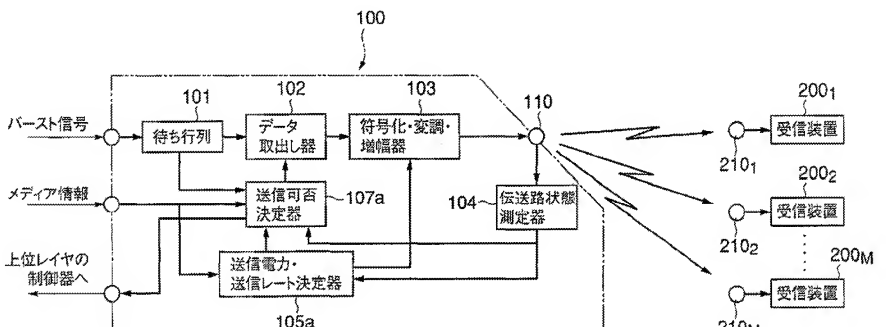
[Drawing 8]

FIG.8



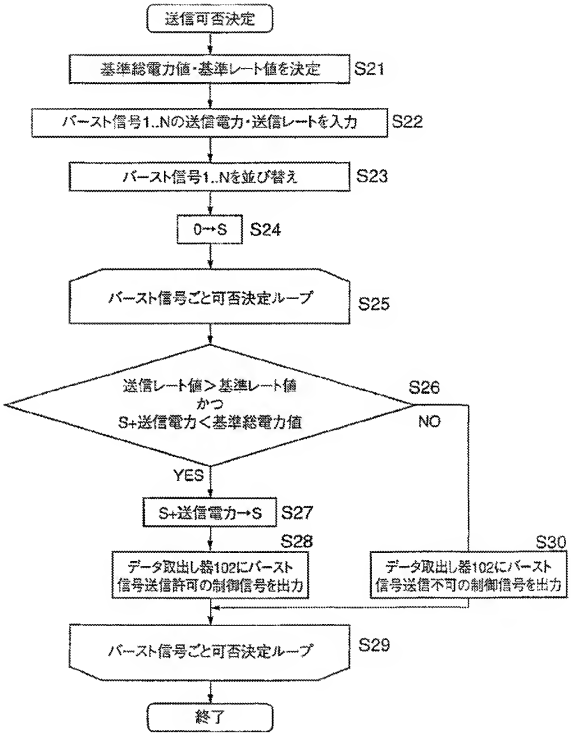
[Drawing 9]

FIG.9


100
101
102
103
110
バースト信号
待ち行列
データ
取出し器
符号化・変調・
増幅器
メディア情報
送信可否
決定器
107a
104
伝送路状態
測定器
上位レイヤの
制御器へ
送信電力・
送信レート決定器
105a
200₁
受信装置
210₁
200₂
受信装置
210₂
200M
受信装置
210M

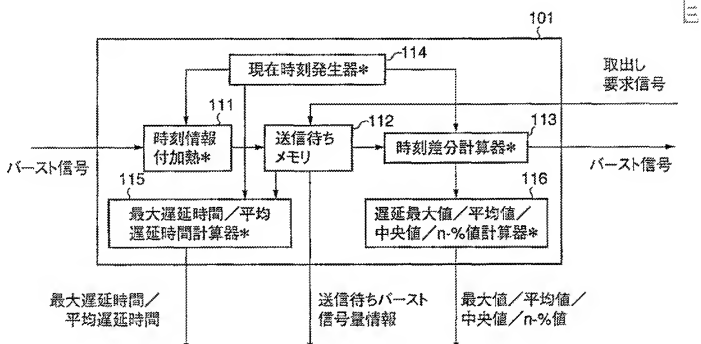
[Drawing 10]

FIG.10


送信可否決定
基準総電力値・基準レート値を決定
S21
バースト信号1..Nの送信電力・送信レートを入力
S22
バースト信号1..Nを並び替え
S23
0→S
S24
バースト信号ごと可否決定ループ
S25
送信レート値＞基準レート値
かつ
S+送信電力＜基準総電力値
S26
NO
YES
S+送信電力→S
S27
S28
データ取出し器102にバースト信号送信許可の制御信号を出力
S30
データ取出し器102にバースト信号送信不可の制御信号を出力
バースト信号ごと可否決定ループ
S29
終了

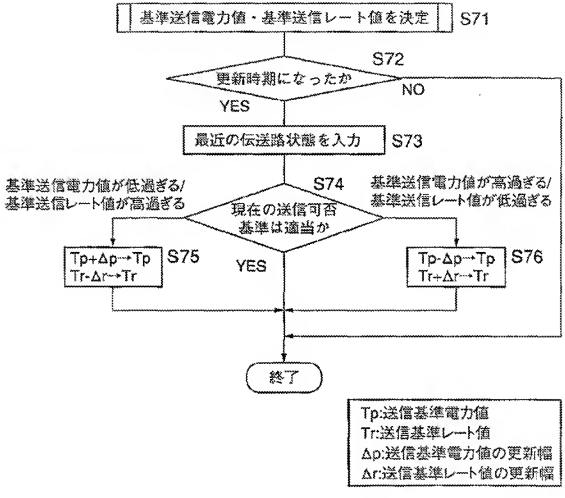
[Drawing 12]

FIG.11



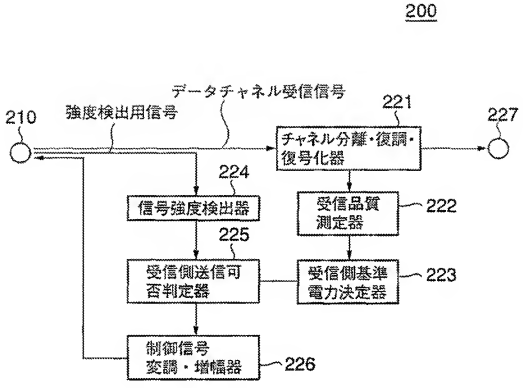
[Drawing 13]

FIG.12



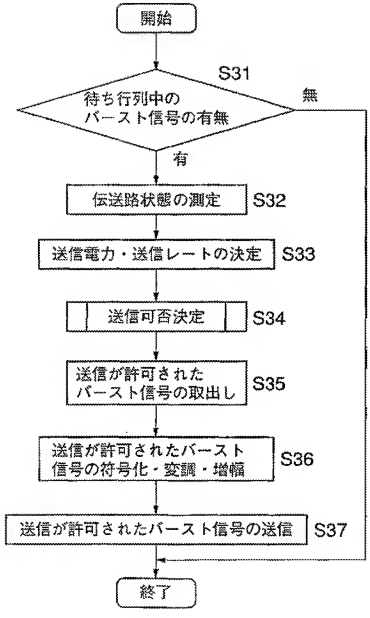
[Drawing 13]

FIG.13



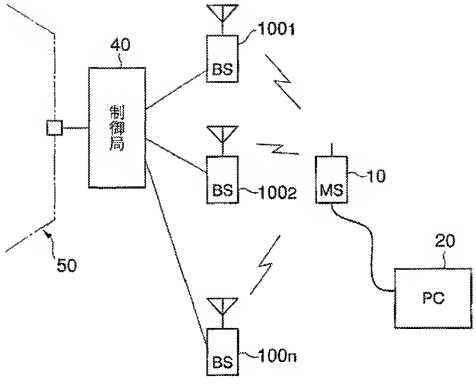
[Drawing 14]

FIG.14



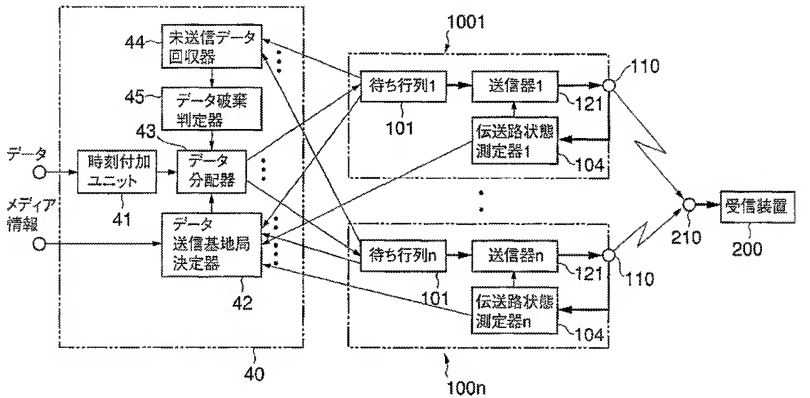
[Drawing 15]

FIG.15



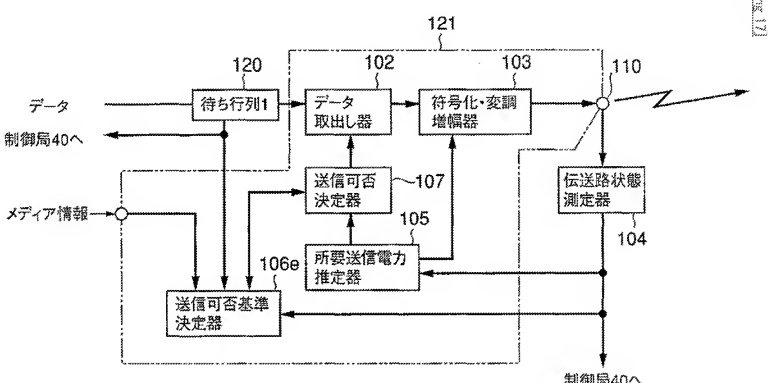
[Drawing 16]

FIG.16


1001
44
未送信データ回収器
45
データ破棄判定器
43
データ分配器
データ
時刻付加ユニット
41
メディア情報
データ送信基地局決定器
42
40
待ち行列1
101
送信器1
121
伝送路状態測定器1
104
110
待ち行列n
101
送信器n
121
伝送路状態測定器n
104
110
100n
210
受信装置
200

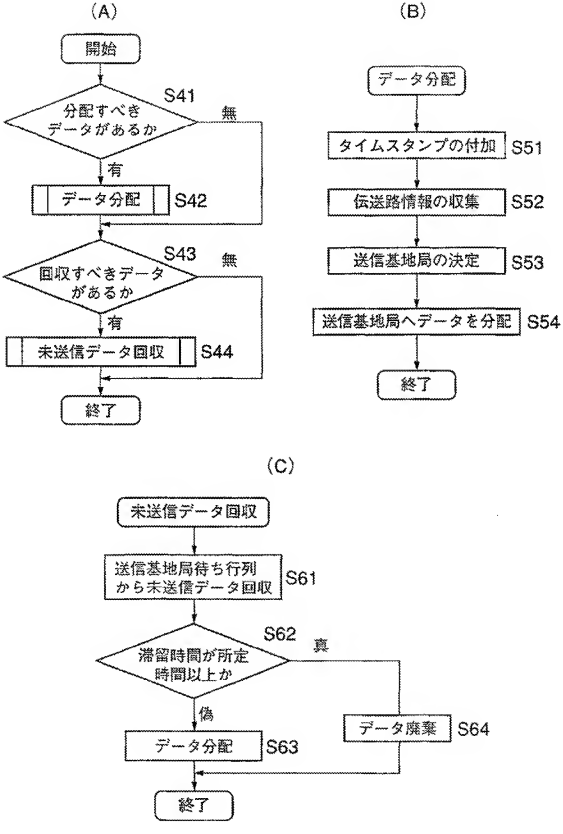
[Drawings 17]

FIG.17



[Drawing 18]

FIG.18


(A)
開始
分配すべきデータがあるか
S41
無
有
データ分配
S42
回収すべきデータがあるか
S43
無
有
未送信データ回収
S44
終了
(B)
データ分配
タイムスタンプの付加
S51
伝送路情報の収集
S52
送信基地局の決定
S53
送信基地局へデータを分配
S54
終了
(C)
未送信データ回収
送信基地局待ち行列から未送信データ回収
S61
滞留時間が所定時間以上か
S62
真
偽
データ廃棄
S64
データ分配
S63
終了